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Ontario. Legislative Assembly

SESSIONAL PAPERS.

VOL. XLIII.—PART VII.

THIRD SESSION

OF THE

TWELFTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

SESSION 1911.

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No. 5... Report of the Inspector of Division Courts, for the year 1910. Presented to the Legislature, 16th February, 1911. *Printed.*

No. 6... Report of the Inspector of Legal Offices, for the year 1910. Presented to the Legislature, 10th March, 1911. *Printed.*

No. 7... Report of the Inspector of Registry Offices, for the year 1910. Presented to the Legislature, 15th March, 1911. *Printed.*

No. 8... Report of the Provincial Municipal Auditor, for the year 1910. Presented to the Legislature, 15th March, 1911. *Printed.*

No. 9... Report of the Commissioners for the Queen Victoria Niagara Falls Park, for the year 1910. Presented to the Legislature, 24th February, 1911. *Printed.*

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No. 10... Report of the Inspector of Insurance and Registrar of Friendly Societies, for the year 1910. Presented to the Legislature, 3rd February, 1911. *Printed.*

No. 11... Financial Statements made by Loan Corporations, Building Societies, Loaning Land Companies and Trust Companies, for the year 1910. Presented to the Legislature, 3rd February, 1911. *Printed.*

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No. 14... Report on Highway Improvement in the Province, for the year 1910. Presented to the Legislature, 15th March, 1911. *Printed.*

No. 15... Report of the Bureau of Labour, for the year 1910. Presented to the Legislature, 22nd March, 1911. *Printed.*

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No. 20... Report of the Provincial Board of Health, for the year 1910. Presented to the Legislature, 23rd February, 1911. *Printed.*

No. 21... Report on the Hospitals for the Insane, for the year 1910. Presented to the Legislature, 15th March, 1911. *Printed.*

No. 22... Report on the Hospitals for Idiots and Epileptics, for the year 1910. Presented to the Legislature, 15th March, 1911. *Printed.*

No. 23... Report upon the Feeble-Minded, for the year 1910. Presented to the Legislature, 22nd March, 1911. *Printed.*

No. 24... Report upon the Hospitals and Charities, for the year 1910. Presented to the Legislature, 15th March, 1911. *Printed.*

No. 25... Report upon the Common Gaols and Prisons, for the year 1910. Presented to the Legislature, 15th March, 1911. *Printed.*

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No. 26... Report upon Neglected and Dependent Children, for the year 1910 Presented to the Legislature, 8th March, 1911. *Printed.*

No. 27... Report upon the Operation of the Liquor License Acts, for the year 1910. Presented to the Legislature, 15th March, 1910. *Printed.*

No. 28... Report of the Department of Agriculture, for 1910.*
*This Report was printed in the Sessional Papers of 1910—No. 28.

No. 29... Report of the Agricultural College and Agricultural Farm, for the year 1910. Presented to the Legislature, 16th March, 1911. *Printed.*

No. 30... Report of the Ontario Vetrinary College, for the year 1910. Presented to the Legislature, 20th March, 1911. *Printed.*

No. 31... Report of the Ontario Agricultural and Experimental Union, for the year 1910. Presented to the Legislature, 16th March, 1911. *Printed.*

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No. 33... Report of the Fruit Branch of the Department of Agriculture, for the year 1910. Presented to the Legislature. 16th March, 1911. *Printed.*

No. 34... Report of the Ontario Vegetable Growers' Association, for the year 1910 Presented to the Legislature, 20th March. 1911. *Printed.*

No. 35... Report of the Corn Growers' Association, for the year 1910. Presented to the Legislature, 20th March, 1911. *Printed.*

No. 36... Report of the Entomological Society of Ontario, for the year 1910. Presented to the Legislature, 16th March, 1911. *Printed.*

No. 37... Report of the Ontario Bee-Keepers' Associations, for the year 1910. Presented to the Legislature, 20th March, 1911. *Printed.*

No. 38... Report of the Dairymen's Associations of Ontario, for the year 1910. Presented to the Legislature. 16th March, 1911. *Printed.*

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No. 39.... Report of the Live Stock Associations of Ontario, for the year 1910. Presented to the Legislature, 3rd February, 1911. *Printed.*

No. 40... Report of the Farmers' Institutes of Ontario, for the year 1910. Presented to the Legislature, 26th January, 1911. *Printed.*

No. 41... Report of the Women's Institutes of Ontario, for the year 1910. Presented to the Legislature, 26th January, 1911. *Printed.*

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* This Report was not presented in the Session of 1911.

No. 43... Report of the Agricultural Societies of Ontario, and the Convention of the Ontario Association of Fairs and Exhibitions, for the year 1910. Presented to the Legislature, 26th January, 1911. *Printed.*

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No. 45... Report of the Bureau of Industries, for the year 1910. Presented to the Legislature, 20th March, 1911. *Printed.*

No. 46... Report of the Inspectors of Factories, for the year 1910. Presented to the Legislature, 20th March, 1911. *Printed.*

No. 47... Report of the Temiskaming and Northern Ontario Railway, for the year ending 31st October, 1910. Presented to the Legislature, 25th January, 1911. *Printed.*

No.. 48... Report of the Hydro-Electric Power Commission, for the year 1910. Presented to the Legislature, 22nd March, 1911. *Printed.*

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No. 49... Report of the Ontario Railway and Municipal Board, for the year 1910. Presented to the Legislature, 28th February, 1911. *Printed.*

No. 50... Supplementary Return from the Records of Elections subsequent to General Elections in 1908. Presented to the Legislature, 24th January, 1911. *Printed.*

No. 51... Copies of Regulations and Orders in Council respecting Department of Education. Presented to the Legislature. 25th January, 1911. *Not Printed.*

No. 52... Report on the State of the Legislative Library. Presented to the Legislature, 31st January, 1911. *Printed.*

No. 53... Report *re* Game Commission.*
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No. 54... Statements of Provincial Auditor under Audit Act. Presented to the Legislature, 25th January, 1911. *Printed.*

No. 55... Copies of Orders in Council under provisions of Surrogate Courts Act. Presented to the Legislature, 3rd February, 1911. *Not Printed.*

No. 56... New Ontario, Situation, Farms, etc. Presented to the Legislature, 3rd February, 1911. *Printed for distribution only.*

No. 57... Dairying in Ontario. Presented to the Legislature, 3rd February, 1911. *Printed for distribution only.*

No. 58... Farming Opportunities in Ontario. Presented to the Legislature, 3rd February, 1911. *Printed for distribution only.*

No. 59... Women's Institutes. Hand-Book. Presented to the Legislature, 9th February, 1911. *Printed for distribution only.*

No. 60... Report on Infant Mortality. Presented to the Legislature, 7th March, 1911. *Printed.*

No. 61... Return to an Order of the House of the 21st day of February, 1911, for a Return shewing: The number of officials, clerks and employees in the various branches of the Provincial Secretary's Department on (*a*) February 1st, 1905; (*b*) January 1st, 1911: with the salaries in each case. The additional work (if any) imposed on each branch and a statement of what has been accomplished thereby. Presented to the Legislature, 15th March, 1911. Mr. *McCart. Not Printed.*

No. 62... Return to an Order of the House of the 20th day of February, 1911, for a return shewing: (*a*) For what commodities supplied to the Public Institutions under the control of the Province of Ontario the Government asks for tenders by advertisement in the public press; (*b*) The commodities supplied to each of the Public Institutions under the control of the Province of Ontario for which tenders are not invited by advertisement in the public press: (*c*) and what system of purchase is adopted in each case under (*a*). Presented to the Legislature, 15th March. 1911. Mr. *Kohler. Not Printed.*

No. 63... Statement of distribution of Revised and Sessional Statutes, for the year 1910. Presented to the Legislature, 15th March, 1911. *Not Printed.*

No. 64... Report of Bureau of Colonization, for the year 1910. Presented to the Legislature, 16th March, 1911. *Printed.*

No. 65... Report, Provincial Archives, for the year 1910. Presented to the Legislature, 20th March, 1911. *Printed.*

No. 66... Return to an Order of the House of the Tenth day of February, 1911, a Return shewing: (1) The amount expended on the revision of the Statutes from the 14th day of February, A.D. 1910; (2) To whom and on what account were the payments made; (3) The total cost of revision to date and shewing: (4) When will the revision be completed. Presented to the Legislature, 20th March, 1911. Mr. *Proudfoot. Not Printed.*

No. 67... Return to an Order of the House of the Twenty-eighth day of February, 1911, for a Return shewing the uniform system of accounting in respect to the various features of the dealing in electric energy by municipalities having contracts with the Hydro-Electric Power Commission which has been approved by the Government. Presented to the Legislature, 20th March, 1911. Mr. *MacKay* (*Grey.*) *Not Printed.*

No. 68... Return to an Order of the House of the Twenty-eighth day of February, 1911, for a Return shewing: (*a*) The institutions under the control of the Province which are supplied with electric power by the Hydro-Electric Power Commission; (*b*) The amount of power supplied in each case, and the date when such power was first supplied; (*c*) The price charged to each such institution for power; (*d*) The cost of installation in each case; (*e*) The system of supplying power displaced by the supplying by the said Commission; (*f*) The cost of the same amount of power under the displaced system; (*g*) The cost price of the plant rendered useless by the change in each case; and (*h*) What other institutions under the control of the Province are to be supplied with electric power by the said Commission. Presented to the Legislature, 20th March, 1911. Mr. *MacKay* (*Grey.*) *Not Printed.*

No. 69... Return to an Order of the House of the Twenty-eighth day of February, 1911, for a Return shewing: (*a*) The damage done to the machinery or equipment in any and all transformer stations of the municipalities contracting with the Hydro-Electric Power Commission since the said Commission commenced to transmit power; (*b*) The dates upon which such damage was occasioned and the extent in money of the damage to machinery or equipment in each case; (*c*) The names of the contractors supplying or installing the machinery or equipment so damaged; (*d*) The cause of the damage in each case, together with all reports received by the Government or any member thereof or the said Commission as to the cause in each case; (*e*) Upon whom will the loss in each case fall—Upon the said Commission, upon the contractor or upon the interested municipality. Presented to the Legislature, 20th March, 1911. Mr. *MacKay* (*Grey.*) *Not Printed.*

No. 70... Return to an Order of the House of the Twenty-eighth day of February, 1911, for a Return shewing: (*a*) How much power has been called for by the Hydro-Electric Power Commission under its agreement

with the Ontario Power Company, giving date of each notice requiring delivery of power, and the amount called for by each notice; (*b*) The amount of power for which the said Commission is now and has been from time to time liable to pay; (*c*) The amount of Power annually taken from time to time from the Ontario Power Company; (*d*) The amount of power actually transmitted from time to time by the said Commission; (*e*) The dates and duration of all interruptions to the delivery of power by the said Commission to the various contracting municipalities; (*f*) The cause of each such interruption, and all reports thereon received by the said Commission or the Government or any member thereof; (*g*) The amount, if any, of the rebate allowed or to be allowed each contracting municipality in consequence of the interruption of the delivery of power. Presented to the Legislature, 20th March, 1911. Mr. *MacKay* (*Grey.*) *Not Printed.*

No. 71... Return to an Order of the House of the Twenty-first day of February, 1911, for a Return shewing: (*a*) The municipalities which have entered into contracts with the Hydro-Electric Power Commission for the supply of power; (*b*) The amount of power contracted for by each such municipality; (*c*) The names of the municipalities to which power is now actually being supplied, with the date upon which power was first supplied, the amount of power now supplied, and the amount of power actually used or sold by each such municipality; (*d*) The actual amount for which such municipality being supplied with power has become liable to the Commission, and the date from which such liability runs. Presented to the Legislature, 20th March, 1911. Mr. *MacKay* (*Grey.*) *Not Printed.*

No. 72... Return to an Order of the House of the Eighth day of February, 1911, for a Return, shewing the names of all temporary or extra game wardens appointed during the seasons 1909 and 1910, with the residence and description of each appointee, the amount paid to each for services and expenses, the locality assigned to each, and the number and general nature of reports received from such game wardens. Presented to the Legislature, 20th March, 1911. Mr. *Elliott. Not Printed.*

No. 73... Return to an Order of the House of the Twenty-seventh day of February, 1911, for a Return shewing (1) A copy of the advertisement calling for tenders for the printing, publishing and supplying of "Ontario Readers"; (2) Copies of all tenders received; (3) Copies of correspondence between the Government of Ontario or any official thereof and any tenderer or tenderers; (4) A copy of the contract entered into on behalf of the Government for the printing, publishing and supplying of "Ontario Readers"; (5) A detailed statement of the cost to the Government of supplying to the publishers electro-plates for each Reader; (6) Comparison of the prices of the old textbooks in the Public and High Schools with those of the corresponding text-books in the new series; (7) Amounts saved to purchasers,

estimated on the basis of previous sales and attendance; (8) Methods of safeguarding the quality of the materials entering into the construction of the text-books and their printing and binding; (9) What provinces, if any, have adopted books of Ontario's new series. Presented to the Legislature, 20th March, 1911. Mr. *Musgrove. Printed.*

No. 74... Return to an Order of the House of the Twenty-first day of February, 1911, for a Return shewing (1) From what date is the Hydro-Electric Commission entitled to payment by the City of Toronto for electrical power contracted for by the City from the said Commission, and if (2) The Commission has been paid the amount owing by the City from said date; (3) What amount *per* month has the City of Toronto become liable to pay to the Hydro-Electric Commission for such power, and from what date. If not paid the reason therefor, and is the City liable to pay interest on such arrears. Presented to the Legislature, 21st March, 1911. Mr. *Proudfoot. Not Printed.*

Eighteenth Report

Neglected and Dependent Children of Ontario

PRINTED BY ORDER OF THE LEGISLATIVE ASSEMBLY

TORONTO:
Printed and Published by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1911

Printed by
WILLIAM BRIGGS,
29-37 Richmond Street West
TORONTO

To the Honourable JOHN MORRISON GIBSON, K.C., LL.D.,

Lieutenant-Governor of Ontario.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to transmit herewith the Eighteenth Annual Report of the Department of Neglected and Dependent Children of Ontario for the year ending December 31st, 1910.

Respectfully submitted,

W. J. HANNA,

Provincial Secretary.

PARLIAMENT BUILDINGS,
TORONTO, FEBRUARY 28, 1911.

OFFICE OF THE

SUPERINTENDENT OF NEGLECTED AND DEPENDENT CHILDREN OF ONTARIO.

The Honourable W. J. HANNA,

Provincial Secretary.

SIR,—I beg to submit herewith the Eighteenth Annual Report of the work of this office, under the Children's Protection Act of Ontario, being for the year ending December 31st, 1910; also Reports on the Industrial Schools of the Province, and Juvenile Immigration.

I have the honour to be,

Sir,

Your obedient servant,

J. J. KELSO,

Superintendent.

PARLIAMENT BUILDINGS,
TORONTO, FEBRUARY 26, 1911.

Friendless No Longer.

ONTARIO

NEGLECTED DEPENDENT CHILDREN

EIGHTEENTH ANNUAL REPORT

TORONTO, February 16, 1911.

THE work of protecting and supervising the children and encouraging them to grow up worthily has been greatly lightened during the past year by the splendid assistance given by the Children's Aid Societies and Committees that are actively engaged in the promotion of this cause. These organizations are of inestimable value to the Province, for not only are they ready at all times to protect and care for the neglected and dependent child, but their influence in preventing neglect and bringing about right social conditions is almost beyond computation. The strength of this movement has always been in its educational and restraining effect, and it can readily be understood that with so many societies and volunteer workers advocating and laboring for the emancipation of childhood from vice, ignorance, and injustice of every kind, many serious evils are averted and normal home life maintained.

There are still some districts where the Children's Aid movement is imperfectly organized, owing to the difficulty of securing a salaried agent, and it has been impossible for me to remedy this owing to a limited appropriation. About $12,000 was spent on work outside the central office last year, and with five thousand dollars more a great advance could be made in bringing about the complete organization of the Province for effective child-protection work. This is preeminently the work that should be most liberally supported by both public and private benevolent funds, for while in this country social customs are still more or less plastic, right methods can be inculcated with some hope of success, and children can be saved from much that is unwholesome and debasing.

With unfailing regularity each day's mail brings to this desk many sad stories of child neglect, of desertion, of destitution, and of immorality. Family complications of the most remarkable kind are outlined, heartrending stories are told of young people who have gone astray, and sometimes it requires a great deal of careful consideration to decide what action is best to restore the broken home, protect, encourage and warn, as the case may be.

With the thousands of children who are out in foster-homes developing all kinds of troubles, there are, of course, many letters relating to them. Young people easily become dissatisfied, and it is important that they should be appeased

and any reasonable complaint adjusted; foster-parents also have their grievances as well as their joys, and diplomacy has to be observed in dealing with them and securing their continuance in well-doing.

This movement for the betterment of home life and the rescue of children from evil surroundings has since its inauguration moved forward with rapid strides. It appealed to the sympathies of the general public, and now every city and almost every town of moderate size has its Children's Aid Society. There were many difficulties to be surmounted, the principle one being the aversion which many good people had to the removal of children from the guardianship of their parents, even though these were vicious or immoral. However, as an outcome of the wise provisions of the Children's Protection Act, the judicious measures of local officers, agents, etc., the beneficial results of the work itself in the great diminution of crime among the young, and specially through the patient and educative work steadily carried on, former prejudices and objections have happily in a great measure disappeared.

The cost of carrying on Children's Aid Society work is comparatively trifling. Probably the expenditure necessary in assuming the guardianship of an average child and preparing and sending it to a foster-home will not exceed the sum of from ten to fifteen dollars. There are, of course, defective children who are not eligible for the ordinary home. These remain longer in the Shelters of the Society, but it is remarkable how many kind and sympathetic people there are in the Province, and as a consequence even an inferior child will in time secure a good home. In contrast to these, we have the fact that when children, through neglect and evil surroundings, are allowed to become delinquent, they cost the Province large amounts. It costs over $350,000 per annum to maintain 11,000 persons in our prisons and another $350,000 is every year required to maintain boys and girls in Institutions and Industrial Schools. Without doubt it is infinitely better for these boys and girls to enjoy the privilege of family life, with its kindly and educative influence, and at the same time be contributing to their own support.

The Children's Aid Society acts as a moral tonic in the community where it exists. Careless and vicious parents learn that the attendance of their children at school is compulsory, also that a certain amount of care and training in the home is obligatory, and in a great many instances these faults are corrected. Delinquent parents are not dealt with hastily. They are warned that home conditions must be improved, and if they continue indifferent the cases are brought before the courts. When the evidence proves that there has been gross neglect, the children are usually handed over to the guardianship of the Society. Frequently parents thus summarily dealt with reform and improve the conditions of their home life.

The Foster-home system is in general use as the correct method of providing for dependent children. At the present time there are over four thousand children from the age of six months to eighteen or twenty years living in adopted or foster-homes; many others have grown up and are now able to care for themselves. A large number of the younger children have been in their homes ten or twelve years, and are treated as children of the family. Many are enjoying the advantages of High School training, or culture along special lines, such as music, drawing,

From Wretchedness

What the
Children's Aid Society
Does for Boys.

To Comfort.

elocution, singing, tailoring, dressmaking, millinery, etc. Many suppose that it is difficult to secure good homes for foster-children. This is a mistake. Some of the best homes in the Province have opened their doors to friendless, homeless children. For every girl, whether younger or older, eligible for placement there are probably a dozen applications. Boys over eight years of age are also in demand. It is somewhat more difficult to place younger boys, but in due time they are adopted, usually by families who have no children of their own.

The Visiting or supervision of the children in their foster-homes is a most important part of the work. Each child is visited once and, if necessary, more frequently, during the year. The purpose of the visitation is to ascertain whether wards are being sent to school, whether they have suitable board and clothing, a comfortable home, cheerful companionship, moral influences, and opportunities to grow up worthy Canadian citizens. As the children grow older and pass school age they receive suitable remuneration as wages, or if they prefer not to receive wages, a certain amount is banked each year for them. It is remarkable how few children require to be removed from foster-parents on account of ill-treatment. Sometimes there is incompatibility of temper, which is generally obviated by placing the child in new surroundings.

The Juvenile Court, with a special Children's Judge in the larger towns and cities, is regarded as a necessity by the Children's Aid Society. We have in Ontario at the present time fairly good laws, but the child delinquent cannot be dealt with successfully without coming under the care of a specialist. The ordinary Police Magistrate is too busy a man to give the necessary time and sympathetic consideration to the saving of children from the consequences of their foolish or criminal acts. The Children's Judge should be one who would never think of a child as a criminal, but treat him as if he were sick or defective. He should love children and always be able to step down to their level and have a fair appreciation of the youthful mind, its temptations, and the motives from which certain actions spring. The Department has been educating public opinion along these lines for many years, and there has been a marked advance everywhere in the judicial treatment of morally weak children.

The Appointment of Probation Officers is a step in the right direction. These attend the court, and when boys and girls are discharged on suspended sentence they take them in charge, visit them at their homes, advise, encourage, admonish and warn them, keeping thus in close touch with their daily life. Employment is secured and earnest efforts are made to awaken ambition, hope, conscientiousness, and other dormant qualities. This work has been done all along by the agents or inspectors of children's aid societies, but there has never yet been in any of our cities a sufficient number of these officials to adequately meet the need.

Playgrounds for children is quite a popular subject at present. An active educational work in this direction is being pushed forward by many social workers. Already Playground Associations have been organized in all the large cities, the object being to secure numerous play centres, properly equipped and supervised. The good results of these supervised playgrounds can scarcely be estimated. Assuredly they will add healthfulness, hopefulness, vivacity and buoyancy to the child life of our populous centres.

It has been well said that "the crimes of men have their origin commonly in the vagrancy of childhood, and that the cost of saving a child is only five per cent. of the cost of punishing a criminal." This will be acceded to by all. Therefore the best investment any Government or community can make of its funds is to introduce and bring to perfection all the machinery possible for the saving of the children.

Many Societies at Work.

There have now been seventy-two Children's Aid Societies officially recognized as qualified to engage in the enforcement of the Children's Protection Act. Noteworthy progress has been made in New Ontario, where the Temiskaming district is well organized, with Col. A. M. Hay as President and Mr. N. J. McAulay as Secretary and Inspector. At Kingston, also, where the work has languished for some time past, Mr. J. C. McConachie, M.A., has recently been appointed Inspector, with jurisdiction in the Counties of Frontenac, Lennox and Addington, and substantial work in that district is anticipated.

Through the energetic services of Mr. W. A. Gunton, as outside agent, a large number of immoral resorts, where children were concerned, have been broken up and several men have been committed to the Penitentiary for leading astray young girls. Complaints concerning neglected children are at once referred to an agent for investigation, no matter how far distant the case may be from Toronto, and prompt action taken either by advice or removal of the children.

Some Notable Gifts.

There have been some notable gifts during the past year that have greatly encouraged philanthropic workers in Ontario. Some of them might be mentioned as follows:—

Mr. E. B. Osler, a prominent citizen of Toronto, handed the Playgrounds Association a cheque for $25,000 to purchase a playground in a congested district. This playground has now been opened, is well-equipped and supervised, and in the season affords pleasure and recreation to over 1,000 children daily.

Inspired, probably, by this example, Miss McCormack, a member of the well-known agricultural implement family of Chicago, has given $10,000 to the Association and promised $5,000 more to equip a playground.

Another citizen has offered to equip a playground, if one is provided, in the eastern part of the City, and the prospect is that before long several other playgrounds will be donated to the children of Toronto by private citizens.

The Civic authorities are not at all behindhand, for over $200,000 are being spent to provide much-needed playgrounds.

For the general work of the Humane Society, and more especially for the education of children in kindness and thoughtfulness, the sum of $25,000 has been bequeathed by Miss Gwynne, of Toronto.

Then in Brantford, a citizen who passed away recently left $1,000 to the Children's Aid Society, and his wife, learning that the Society desired to erect a shelter

for children as a memorial to their late Secretary, Mr. S. M. Thomson, decided to add enough money to put up a suitable building, making the gift $7,000. In other directions, also, there is a marked inclination on the part of wealthy citizens to suitably endow worthy humane and philanthropic enterprises.

In Guelph the citizens contributed $1,500 on Tag Day to help provide a new Children's Shelter.

In Stratford, a citizen gave $500 and sold property at a reduced valuation in order that a Shelter might be available for the Society's work.

In Brockville, a prominent family has taken a deep interest in the Children's Aid Society, and will present a Shelter property if the annual maintenance can be assured.

In Chatham, Mr. F. Moore left the sum of $9,000 to the Society for a shelter building.

Many more such gifts to the children's cause are confidently looked for.

One of Our Foster Homes.

Homes Found for Children.

As one of the principal functions of a Children's Aid Society is to place homeless children in foster-homes, it can readily be understood that every working day sees children coming and going to homes. During the past year 758 children were sent to foster-homes for the first time, while no less than 325 children placed out in former years were changed from one home to another, not necessarily for any serious fault on either side. Even this is but a partial statement, as other children were found homes of whom the particulars were not sent in. A regrettable feature of this branch of the work is that children are not available for half the excellent homes that offer. Not long ago the Children's Aid Society of Hamilton reported some fifteen children in institutions that might be placed out with advantage.

Through the co-operation of two agents in other districts, these children were provided for at once. Many children are at present kept in public institutions that should be given the privilege of family home life, but obstacles of considerable dimensions seem to arise every time this is seriously proposed or attempted.

Societies Placing Children.

The following table gives the number of children placed in foster-homes by the various Children's Aid Societies, also the number of delinquents dealt with by the courts:

	Placed in Foster-homes.	Delinquents in Court.
Ottawa	93	259
London	53	26
Toronto	36	928
" St. Vincent de Paul	10	228
Belleville	45	57
Brantford	26	116
Brockville	12	25
Berlin	68	66
Hamilton	44	6
Huntsville	2	..
Haldimand	2	..
Kingston	14	18
Listowel	5	..
Lindsay	4	3
Niagara	8	12
Orillia	8	5
Port Hope	6	3
Parry Sound	10	20
Picton	7	4
Sarnia	12	13
St. Thomas	16	6
Stratford	36	..
Sault Ste. Marie	35	3
Simcoe	15	4
Temiskaming	4	2
Uxbridge	3	..
Woodstock	17	8
Through Central Office	167	..
	758	1,781

A Larger Work Possible.

It is not at all satisfactory that in a city like Toronto, with nearly four hundred thousand inhabitants, the Society should only be able to find homes for thirty-six children. Charitable institutions are overcrowded, and, while the dependent and unfortunate classes keep coming in, comparatively little effort is made to transplant them back again to rural districts. An unfair burden is in this way placed upon the benevolent public and upon the city as a whole. With a well organized Home-Finding Committee many children could with advantage be removed from charitable institutions, and thousands of dollars annually saved to the city. Although not fully recognized, this branch of philanthropy is of vital importance to the city's best welfare.

It would be a good plan also if some of our existing institutions for normal children could be turned into receiving homes for the abnormal, the defective, the feeble-minded, and unwanted ones that need sympathy and protection far more than the strong and healthy.

Good Leadership Desirable.

Our aim during the past few years has been to secure a few really good men to act as district agents, and shape and direct the work wisely and carefully. To secure the best results in Children's Aid work it is absolutely necessary that the men and women who are actively engaged in it should be possessed of the highest degree of intelligence and judgment, as well as sympathy. In dealing with children a single act may make or mar a whole destiny, and there is no greater responsibility placed upon any person than the decision as to when a family should be broken up. It must always be remembered that not only have parents a great and lasting influence in moulding the character of their children, but the children themselves are providentially placed in the home to exercise an influence over the parents. Many a man or woman has been steadied and kept from wrong-doing by the thought of their children, and even after they have fallen into careless and dissipated ways they have been inspired and stimulated to better things through family ties. Many a dissipated father has been restored to decent living through the prayers and pleadings of a son or daughter. and though for years the case may have seemed hopeless, in the end the family ties have been able to draw together the broken fragments and save the home from utter destruction. No stronger tie exists on earth than that of kinship, and while there are undoubtedly frequent instances where no other course is open than to remove the child or children, there are also many other cases where patient and faithful effort on the part of good people would remove the evil from the home and thus preserve to the children their priceless heritage. It is well that we who are engaged in philanthropic work should realize this and always keep in view the preservation of the family life so long as there remains one last chance of developing good out of evil.

Schooling.

While I am quite satisfied that the educational standard is being steadily raised and that children are getting greater advantages in this respect than ever before, still there is vast room for improvement. It is exceedingly difficult to get country people to send children to school for more than four or five months in the year, although we are constantly urging upon them the supreme importance of allowing the boys and girls to acquire an education before it is too late. Where they have no ambition a boy or girl over fourteen can rarely acquire knowledge, and the likelihood is that if they do not learn to read and write properly before reaching that age they will never enjoy the inestimable privilege of this mode of communication. There is no sadder experience comes to the true friend of children than to meet large, well-developed and mentally normal young people who are not able to read and write, and yet there is still a number in this unfortunate position. Should we

not therefore press steadily forward until the day arrives when absolutely no healthy child in the community over twelve will be ignorant of letters? The prospects are bright, for the spirit of humanity and thoughtfulness is abroad in the land. A defect in machinery is that a large proportion of the municipalities make no attempt to enforce school attendance.

Deformity Corrected.

The work of this Department is varied and deals not only with such children as are in moral or physical danger, but others that require surgical attention. Quite recently one of our agents discovered a child, age three, with not the slightest use of its feet, and whose parents apparently had little idea of the assistance that could be obtained in correcting this deformity. The child is reported to be a particularly bright child, and there is every probability that he will develop into a fine man under the special professional care to which he was introduced through the medium of this office. If the indifference of the parents had not been dispersed by the attention of our officers, there is no doubt that the lad would have become a cripple for life and probably a public charge.

Caring for the Needy.

That there is indeed a need for someone to look after the poor, neglected children of the country is easily seen from the following story. It is the report of one of our agents sent out to investigate this case, about which word had reached this office:—

"Thirty-four miles' drive on a cold day found this family, not at C., but fully six miles past there. The father is quite an elderly man, but evidently a poor manager. He has a team, wagon and a sleigh, has his two boys, sixteen and fourteen, working with him, and yet they cannot get above dire poverty. They live in an old deserted lumber shanty, which is said to leak so badly that they are nearly drowned out whenever it rains. This place is so open that in spite of a pile of rags stuffed in here and there the wind blows through. Worst of all, the children, three of them girls, have no boots nor stockings, except the older boys. They have no underclothing, and simply wear a cotton dress and shirt. The youngest child had on an old dress with no sleeves, and absolutely nothing else, and Mrs. ——— says they have nothing else whatever to wear. There are two beds and the frame of an old couch. Each bed has a mattress and one pillow, the one with a blanket for a covering, the other has a quilt. The couch was simply composed of old springs with narrow slats on top and a piece of carpet; no covering for the girls who sleep on this, excepting the men's coats when they come in from work. How they kept from freezing is a mystery.

"They were so thinly clad that we did not dare to bring them out in the winter weather, and so returned, and in the morning a large sleigh with clothing, blankets, etc., was sent out."

The younger children were cared for by the local Society until the parents were in better circumstances. All are living happily together again.

Social Welfare Work.

Of recent years there has been a growing interest in social welfare work, and some splendid reforms are being brought about that will make home life happier for the poor than ever before. Chief among these might be mentioned: — A

general tendency to increase wages and shorten the hours of labor; employers are providing healthier shops and factories, with sanitary conveniences, recreation and lunch rooms, sick benefit funds, etc.; Health Departments are more active in combatting disease and dirt; Nursing Missions of various kinds are bringing health and good cheer to many humble homes; there is now medical and dental inspection of children, with the prevention of pain and sickness as a consequence. Fresh Air Funds are numerous and active, the playground movement is popular, churches are preaching and acting out a social Christianity, and in every walk of life the spirit of kindness and good-will is prevalent.

Free Dental Treatment for Children.

There is an enormous amount of suffering among children from decaying teeth, and although it can easily be prevented little has been done because of the poverty of parents. When decaying teeth are neglected, not only are the children allowed to suffer unnecessary torture, but their normal development and general health is affected, so that they cannot make good progress in study or manual training. In all our Canadian cities there should be public dentists and the teeth of every child in the community should be carefully attended to at the city's expense where necessary. Germany now has municipal dentists in all the large towns. Classes of school children are brought to the office of the city dentist and after a brief examination a card is given each child. The work of filling is done on Saturdays. Russia has also taken up this important work, and there are in St. Petersburg nine free dental offices for children.

Intervention Brings Reform.

In the social work of the future efforts should be more than ever directed to the prosecution of parents who neglect or fail to properly educate and control their children. The fact is that many of the most neglectful parents only need to be checked up promptly in order to restore the dormant feeling of regard for their young. They resent interference because they do not understand the law, but with the law and the Gospel going hand-in-hand they may, with patient and persistent effort, be induced to discharge their natural obligations faithfully and well. Through the instrumentality of the Children's Aid Societies thousands of homes have been materially improved by firm but friendly intervention.

Illegitimate Infants.

In view of the many serious cases of infant neglect and early death that are constantly being reported, it is desirable that some better means of protection should be devised. Under the law as at present there is no authority given to any official to exercise supervision over this class of children or to compel the unmarried mother to properly care for the little one. Often they are advised to go into a public institution, but if they refuse to do so there is no way in which they can be compelled.

In Toronto, But Looks Like Georgia.

A Cent a Lick.

Then, again, there is no law to prevent a young unmarried mother from giving away the child to any person who will accept it, no matter how impecunious or disreputable they may be. The payment of money has led to grave abuse, as poor people are tempted to adopt a baby "with means," and then either desert it somewhere or hasten its demise. Many of these unfortunate babies die a slow but certain death through neglect and deliberate starvation.

All such infants should be recorded and supervised by the Health Department of each city until the first year is past. Of course, where a regular and satisfactory adoption is arranged such supervision could be cancelled or made quite unofficial. There should also be authority to compel a young mother who is without money or friends to accept shelter in an institution, so that she may properly perform her maternal duties.

Street Trading.

Street trading by children and young persons was made the subject of enquiry by a Departmental Committee appointed by the Secretary for Scotland. After full consideration of the facts, it was unanimously agreed that street trading was most demoralizing to children and young persons, and should be prohibited by law under the age of eighteen years. It has been clearly established that street trading is virtually an apprenticeship to casual labour at the most critical period in life, when it is of the utmost importance that children and young persons should be acquiring habits of industry and discipline to fit them to become useful citizens. This view has been widely adopted by social workers in Great Britain, and should serve as an object lesson in Canada. Too many young children are permitted to run the streets to their own lasting injury, and also to the loss of the community. We should ever seek to avoid the known evils of older civilizations.

Quite recently the London County Council has passed a by-law forbidding any girl under sixteen to trade in the streets, also any boy under fourteen, and lads under sixteen after 9 p.m. It is estimated that this will remove from the streets of London at least 11,000 children, to their lasting benefit, provided, of course, suitable education takes the place of the former street life.

Children on the Streets at Night.

While the remedy seems difficult, the evil of allowing children to be on the streets at late hours is only too apparent. In the past twenty years probably one thousand requests have come to this office for information or advice on the subject or pointing out the dangers to young people from moral contagion. Experience proved that the "curfew" law was not enforced, even in the places where public sentiment seemed strongest. An unfortunate selection was made in the name of the ordinance, as the word "curfew" suggests an ancient and obsolete custom, and leads to ridicule—one of the surest ways of defeating the object aimed at. In the amended Children's Act, the word is not used, and it should be dropped absolutely. Under the Children's Act a municipal by-law can be passed requiring children to be at home after eight or nine o'clock unless accompanied by their parents. Even without such a by-law the agents of the Children's Aid Societies would be quite

warranted in calling officially upon parents who habitually allow their children to wander the streets.

The wording of the Children's Act is now as follows:

Sec. 19.—(1) Municipal councils in cities, towns and incorporated villages may pass by-laws regulating the time after which children shall not be in a public place at night without proper guardianship, and the age or apparent age of boys and girls respectively, under which they shall be required to be in their homes at the hour appointed.

(2) A child found in a public place after the time appointed may be warned to go home by any constable or peace officer, and if after such warning the child is found loitering in a public place such child may be taken by the constable or officer to its home, or to the Children's Shelter.

(3) Any parent may be summoned for permitting his child to habitually violate such by-law, and may be fined for the first offence $1, without costs, and for the second offence $2, and for a third or any subsequent offence $5.

Widows and Deserted Mothers.

For many years the cause of the widow left with a family to support has been advocated. In studying out the causes that lead to child dependency and delinquency it will be found that one of the chief has been the death or desertion of the father, leaving the maintenance and training of a number of children to fall entirely upon the mother. Without any means of support, as many of these mothers are, it is necessary that they should go out to work, leaving the children to their own resources. Coming home exhausted at night, she is able

A Deserted Wife's Predicament.

to do very little to make up for the day's absence, and the children spend most of their time on the streets with absolutely no home training of any kind. The day and Sunday school may counteract these evil tendencies in some cases, but in the majority of instances the attendance of the children is irregular and depends largely upon the faithfulness of the mission worker in hunting them up and securing their presence. Looking over the records of children who become a public charge, almost half could be traced to this one source. It is rare indeed that children will be either dependent or delinquent where the father and mother are

living together in happy and harmonious relationship. Where the father wilfully deserts his family, very little effort is made to punish him or compel him to fulfil his obligations. Among the poorer class it is altogether too common an occurrence for a father to desert his family, when he finds its support too great a task upon his exertion, and the mother uncomplainingly takes up the burden, and lives to see one boy drift off to the Reformatory, a girl take to the streets, and others placed in institutions or permitted to grow up without ambition or industry, to swell that numerous class that live on the charity or gullibility of others. These facts are so common in the experience of those who have to do with the poor that it seems to be taken as a condition of things that has to be. When a man deliberately deserts his family the police authorities should have full authority to find him, and the courts should give him to understand that he must support his children, even if he has to do it in prison. Failing action of this kind, the interests of the children should be considered, and they should be placed under such influences as will ensure their growing up in a normal way. If the mother is an honest, respectable woman, she ought to be enabled from some public fund to remain at home and train the children; but if she is weak and characterless, inclined to drink and indolence, the children should be removed from her care and given a fair opportunity to make the most of their young lives. It is becoming increasingly recognized that no man nor woman, however close the relationship may be, has a right to doom children to perpetual degradation and wretchedness, and it is the duty of the community to see that every child has reasonable opportunity for making a fair start in life.

A measure recently introduced in the Legislature by the Attorney-General will secure some degree of justice for deserted wives, the Act providing that fathers may be compelled to contribute from five to ten dollars per week to the support of his family, where separation takes place. Application is also being made to the Dominion Parliament for an amendment to the Criminal Code.

The Child Without Family Ties.

The child of fourteen to eighteen who has gone astray and who has neither father nor mother, brother nor sister, is exceedingly hard to control. There is no sentiment to which one can appeal except abstract goodness, and often the child may, as the result of special pleading, be willing and anxious to do better, and yet fall before the next temptation because of homelessness, loneliness, and lack of any worthy incentive. Many a child has been constrained to do right and resist temptation rather than break a mother's heart or cause a respectable father shame and humiliation. We are all the creatures of environment, saved and upheld by the loving influences that stream into our lives from many sources. The child who is bereft of all home ties is greatly to be pitied, and it is not to be wondered at that they so often drift into evil ways and live a sordid life.

It is for this reason that I have always advocated the preservation and upbuilding of the home, however poor or desolate it may be, always hoping and expecting that right effort and patience, even in the presence of apparent defeat, will ultimately bring about the happy consummation of a respectable home preserved to the child, and child and parent kept united in that most sacred and beautiful of all earthly relationships.

The Moving Picture Business.

The moving picture show, along with many desirable and commendable features, has brought forth the perplexing problem of what standard should be adopted in regard to the character of pictures which should be permitted to be exhibited in these theatres. There has been an agitation for a strict censorship of these pictures, and the companies engaged in their production have shown themselves surprisingly willing to submit the pictures to any individual or committee that would be vested with authority to pass upon them. In New York there is established a National Board of Censorship of Motion Pictures, to which is submitted practically all the motion pictures that are exhibited in the United States. This Board of Censorship is a voluntary organization representative of widely varying shades of opinion in regard to art, the drama and social problems, but bound together by a desire to make as useful and as beneficial as may be a form of amusement which is rapidly superseding all others in popularity among the people whose income and whose amusements are limited. The reason why the motion picture companies are willing to submit their product to a Board of Censorship is purely a matter of business. They realize that "one morally offensive picture may be the exciting cause for a far-reaching agitation against motion pictures," and, being bound together in one large body, they are able to restrain any individual company which thought it saw good business in producing pictures that were criminal and immoral.

As the motion picture show has evidently come to stay, every effort should be made to eliminate all that is harmful. Pictures which glorify acts of violence and portray criminals in a manner which tends to make heroes of them should be prohibited. At the same time it must be recognized that much that is classical in the drama—and the motion picture is a form of dramatic art—would be rejected if all scenes of violence were prohibited from the stage. Lessons of patriotism are taught by the portrayal of warlike scenes from the history of a country, and, while ultra-sensationalism must be avoided, all that savors of roughness cannot be eliminated from life nor can it be removed from that which claims to portray life. The ideal aimed at should be that the lesson taught or the fun made be clean, wholesome and elevating, and of these there should be no doubt. Many of the undesirable accompaniments of motion picture exhibitions are not necessarily a part of them, and could be cured by local regulations.

On account of their cheapness, these exhibitions have been patronized largely by children, and there is a widespread feeling of uneasiness on this account. Sometimes the vaudeville performers who take part at these picture shows pander to a low taste, and suggestive jokes and songs are indulged in. These are all a part of the problem which affects the theatre proper, and should be treated in the same way. Nasty suggestion in manner, speech and lack of clothing are the faults of the vaudeville, and these are matched at the so-called high-class theatres by problem plays which treat of themes that are forbidden in polite conversation. In the latter instance it is, perhaps, a safeguard that the patrons have a certain amount of education, but immature minds should not be subjected to their evil influences, and the effort should be continuous to form a healthy public opinion in regard to

all public performances. If the adult population will have theatrical performances that are, to say the least, vulgar, and children should be protected from contamination, and the most practical way to accomplish this would be to prohibit the attendance at theatres and motion picture exhibitions of childre under sixteen years of age, unless accompanied by a parent or guardian.

It is gratifying to know that the Ontario Legislature has now agreed upon legislation that will largely correct the evils complained of.

THE PROPER KIND OF AMUSEMENT.

WORK FOR CATHOLIC CHILDREN.

The following is the Report of Mr. William O'Connor, who continues with much success to supervise the interests of Roman Catholic children:—

The total number of Roman Catholic children placed in foster-homes for the first time by the Children's Aid Societies of the Province during the year 1910 was 125. This is a smaller number than was placed the year previous, but, as was explained in the report for 1909, 46 of the children then reported as placed were allowed to remain at their own homes, and during last year only 16 were placed in that way; therefore, the real number placed in foster-homes last year was 109, which is a considerable increase over the number placed in 1909.

The placing of children with their own parents after they have been made wards of the Children's Aid Societies has, in most instances, been a doubtful success. The theory is good, but in practical working it has been found that children, who are already wards of Children's Aid Societies, can not be again taken from their parents without being brought before a judge. The end in view could be served by placing the children on probation in their own homes and having a sufficient number of visitors to properly supervise the children and their homes.

The Societies who placed the 125 children last year were:—Ottawa, 25; St. Vincent de Paul, Toronto, 10; Sault Ste. Marie, 10; Guelph, 7; Fort William, 5; Waterloo, 6; Owen Sound, 4; Sarnia, 3; Hamilton, 3; St. Thomas, 3; Uxbridge, 3; Kenora, 2; St. John's Industrial School, 23; Provincial Office, 18; and Brockville, Dunnville, and North Bay, 1 each (included in table).

The ages were:—Under two years, 8; two to eight years, 35; eight to twelve years, 43; twelve to sixteen years, 37; over sixteen years, 2.

The number of children under twelve years of age who were placed was 86, or nearly 69 per cent. of the total. These figures show more favorably than did those of last year in regard to the placing of young children. Every one of the older children receives a better home with greatly improved opportunities for leading an honest life than he had in his own home, but he is expected to make a return in work for his maintenance. The younger children receive more from their foster-parents than they give in actual cash value, and self-interest is eliminated.

The parentage of the children was:—Mother living; 30; father living, 30; both parents living, 54; both parents dead, 6; no information, 5.

Divided according to sex, the children taken in charge by Children's Aid Societies were:—Male, 71; female, 54.

During the year, 18 children were returned from foster-homes as unsatisfactory, 5 were removed because the homes were unsatisfactory, 9 ran away from their homes, 27 were replaced in other homes, 16 were adopted to their own parents, and 18 were allowed to return to their own homes after spending some time in a foster-home; supervision ceased in regard to 18, 2 died, and 4 were married.

Attention must again be called to these children who never die. The two deaths reported were of children under two years of age, who had recently been taken from poor home surroundings. In spite of poverty and lack of sanitary precautions in the homes whence they come, these children invariably thrive when placed in foster-homes. This is an evidence in favor of the country, where the most of these children are placed.

In addition to the above, 35 children were placed for the first time in foster-homes by Roman Catholic Orphanages in Ontario:—Sacred Heart Orphanage, Toronto, 14; St. Vincent's Infants' Home, Toronto, 5; St. Mary's Orphanage, Hamilton, 5; Mount St. Joseph Orphanage, London, 11; and 8 children were replaced from these institutions.

The work among the Roman Catholic children is keeping pace with the work in general. There are in the books 1,000 names of children who have been placed in foster-homes by the Children's Aid Societies of the Province, and 475 have been reported as placed from the Orphanages. The numbers under active supervision at present are 650 wards of Children's Aid Societies and 300 wards of Orphanages. Of these 626 were visited in their foster-homes last year, and over 6,000 miles of railroad were travelled in doing the work.

Many interesting incidents are met with in the work. Dealing with human beings, it is replete with human interest. The two following may be taken as a warning against lightly prophesying evil results in the lives of any children, no matter how bad their antecedents or previous conditions. A little girl was taken from her father and placed under guardianship of a Children's Aid Society because of his intemperate habits and his thieving while under the influence of liquor. The child was particularly bright and obtained a home where she was allowed to attend school up to an advanced age in return for services given morning and evening, and, finally, was fitted for a nice position. In the meantime the father had been committed to a penal institution because of his stealing. His daughter interceded on his behalf and obtained his release, chiefly owing to her excellent reputation and the ability with which she pleaded her father's cause. A boy, aged twelve, was committed to an Industrial School after a comparatively long career of pilfering, etc. At the trial this lad conducted himself with such an air of careless braggadocio as to attract the attention of judge and lawyers. His companion in his last escapade was fearful of the consequences of his acts, and when also committed to an Industrial School burst into tears. The first lad turned to a lawyer seated near him, and, using a good round oath, said:—"Did you ever see such a face?" This boy was set down as a hard case, who would grow up to be a bad man. After spending one year at the Industrial School he was apprenticed to a farmer, and six months after, at Christmas time, he sent a card, which read:—"I like my place all right, and I get all I want to eat, and I have a lot of little chickens of my own here." He may have been a bad man in the making, but he was only a child.

SUPERVISION.

Visiting Children in Their Foster-Homes an Essential Feature of Placing-Out Work.

It is interesting to note that from the appropriation annually voted for the Children's Aid Work nearly $8,000 is spent in visiting children in foster-homes.

The personal visitation of foster-children in their country homes is so important and essential that it may be regarded as the pivotal point in the work. Any error in the placement of a child may be corrected on the first visit, and if then or subsequently there is abuse or overwork, lack of schooling, or insufficient clothing, the Visitor will be almost sure to detect it and advise or remonstrate with the foster-parents, removing the child if the circumstances are sufficiently aggravated to warrant such action. The danger is that many institutions regard the care of children while in the Home of primary importance, and do not pay sufficient attention to the work of placing and supervising the children who go out to make their own way in the world. Another difficulty is that the personal supervision of children means the time of an official and the expense of travelling, which can ill be afforded by a charity depending almost entirely upon benevolent contributions. But notwithstanding the difficulty and expense, it is better that children should not be placed out at all than that they should be placed and no arrangements made for these friendly visits of inspection. The letters received from children, while interesting and sometimes useful indications of the progress being made, cannot be relied upon as an evidence of happiness or kind treatment. These children are seldom able to write themselves, and they have to be supplied with writing materials and postage stamps and prompted what to say. It is not at all likely that foster-parents will let anything go in a letter that will reflect upon themselves, and as a matter of fact many children, even up to the age of eighteen, have stated that they were quite unable, owing to the above reasons, to write freely, giving the correct version of their treatment

(For the assistance and relief of public charities provision has been made whereby any child registered in the Provincial Office can be visited and reported on without expense.)

Often a Visitor can, by a little friendly advice, bridge over difficulties that may have arisen between the child and the foster-parents, and restore harmony where discord prevailed. The clothing may not be quite up to the mark, or the child's sleeping accommodation may not be satisfactory, or the schooling may have been neglected, and these and other grievances only require a few words to set right. The fact, too, that a Visitor may come at any time will lead the foster-parents to keep the clothing in good order and to be ready at any moment to give a satisfactory account of their stewardship. If it is understood that no one will visit the child, the strong probability is that people will get into careless ways and the child will consequently suffer.

Look at it from the child's standpoint also: It is very pleasant for him to know that someone is interested in his welfare and will pay him a visit. At first the child may feel shy and be unwilling to talk, but a tactful Visitor will soon win his confidence and learn from his manner or expression just how he feels toward his home and foster-parents. Little cares which worry and perplex the foster-parents can be discussed and a promise secured from the child to try and improve. It is very rare indeed that the visits of someone from the Society or institution are resented, and it is much oftener the case that they are looked forward to with pleasure both by foster-parents and child. I have personally known foster-parents to complain that no one ever came to visit them and see how the child was getting along and how they were keeping their agreement.

It can, therefore, be taken for granted that the foster-parents will always welcome the Visitor, while those who are likely to be annoyed by a visit are those who are not treating the child right, and who know that a conscientious Visitor will probably recommend a transfer of the child to another home.

Foster-parents, when adopting children, frequently say, "Now, we want this child for our very own, and we do hope it will not be necessary for any one to visit us for the purpose of seeing our home," and so on. Others, having given the matter more consideration, say, and rightly so, "We are going to do the very best we can with and for this child, and we want you to send some one out to see our home and note the progress of our little one." This indicates a marked difference of opinion with regard to the supervision of homes in the minds of foster-parents, as well as in that of the public generally.

Views of Mrs. Harvie.

In order to remove the objections entertained by some good people to the effect that the proper supervision of foster-children in their homes is unnecessary or that it tends to become an officious interference with the rights of foster-parents, I have asked Mrs. Harvie, as a result of her long experience, to write a few reasons for its existence and maintenance as a successful phase of our child-saving system, and these will illustrate its usefulness and emphasize its value:

Child and Foster Home.

In our advanced twentieth century life of culture and opportunity for improvement, there is very little difference of opinion regarding the importance of the question of education.

It must be remembered, however, that many of our foster-parents are elderly or middle-aged people who probably have not been blessed with many educational advantages in their earlier years, and yet have been successful in acquiring a competence, or even wealth, in the shape of property, farms, stock, etc. It is natural that these should not place much stress on the matter of schooling. They reason thus: "We had no schooling of any account after we were ten or twelve years of age, and have we not succeeded all right? No one could have done any better." Consequently, when work, either in the house or in the field, drags behind, the first thought is (and a decision, accordingly, usually follows the thought), Johnnie or Jimmie, or Lucy or Mary, *must* stay at home from school and "help" with the "chores" or the housework. Many parents treat their *own* children in this fashion. At this point a judicious Visitor, calling at the home, can without difficulty impress the minds of foster-parents, who are probably really kind, sensible people and have the interests of the child at heart, with the strictness of the law in this regard, and that *it* demands the attendance of children at school until after

they are fourteen years of age. If attention is not given to this warning the child can be removed without any further delay. There are doubtless more removals for neglect in the matter of schooling than for all other causes combined.

Clothing and Home Comforts.

To the child mind, especially in the case of little girls, the matter of dress is of paramount importance. Some very earnest, good people, whose homes are satisfactory in almost every respect, are old-fashioned and conservative to a degree on the question of dress, ornaments, etc., and sometimes sensitive little hearts are sore and sad because some other child has laughed at the cut or the material of their garments. A kind-hearted Visitor, who understands the child mind as well as the grown-up one, can usually by a few tactful hints or suggestions, a word of commendation or the reverse, if necessary, modify this state of affairs, when if left to adjust themselves the case would be hopeless, and through discontent or rebellion at the conditions the child might lose what was, in other respects, a good home. It is the duty of the visitors to examine the clothing, that which is worn both on week-days and on Sundays, and note whether or not it is suitable for the station in life occupied by the foster-parents. Frequently, even in a good home, a child is, through carelessness or thoughtlessness, deprived of toilet necessaries and comforts in their bedrooms. Children in all foster-homes having the least pretension to respectability, should have comfortable and well-ordered sleeping apartments, as these things materially assist in training young people in habits of cleanliness, order and neatness. A thorough Visitor always inspects, or inquires concerning, the sleeping arrangements for the child. A Visitor of several years' experience states that quite frequently advice, and even commands, with regard to the sleeping rooms of both boys and girls were required in otherwise most excellent homes.

Need of Occasional Enquiry.

In the case of death or removal of foster-parents, without supervision, there is danger that the child may drift, as to location, away from the knowledge of the Department or the Children's Aid Society placing it. An instance of this kind occurs to the writer. A dear little baby boy was adopted by friends who had no children of their own. They particularly requested that very little supervision should be exercised. Consequently, it was nearly two years before a Visitor called. Upon inquiry being made it was found that in the meantime the foster-mother had suddenly died, and the foster-father had sold his farm and gone to the United States, leaving the little boy wih his sister, who lived in the vicinity. Upon reaching her home, she stated that the care of the child, then about three years old, had been too much for her, and that she had given him to a neighbor who had taken an interest in the little fellow, and who now lived several miles away. At length this home was found, and as it proved a good one the boy has remained there. But it was a chance arrangement and might have been far from satisfactory. Were it not for supervision, this child, even though adopted by well-meaning persons, would have become a "friendless waif," dependent on the good or bad offices of whoever had him in charge, without guardians, alone in the world.

Services and Wages.

The question of wages and remuneration for services rendered is one of the most difficult of problems in connection with home finding for the older children. Doubtless, here, more than anywhere else, kindly supervision, either from the Department or the Society, direct, or through the intervention of a wise Visitor, is most helpful. Young people in their "teens" are apt to regard the work they perform far beyond its real value in the market, and not being aware from personal experience as to the increase in the cost of living, they imagine that by doing a boy's or a girl's work fairly well they

have earned far more than their board and clothing. Again, foster-parents, especially in rural districts, who work hard themselves, frequently without any very tangible return in money value, though they will admit that they make and enjoy a "good living," are inclined to minimize the value of the services rendered by the children they admit into their homes. Here the Visitor can be of great assistance. He comes from the outside world with an unprejudiced mind and a full knowledge of how the matter of wages is settled in other homes and various localities. The matter is discussed, and generally an amicable arrangement can be made. Or the financial agreements can be, and most frequently are, settled by correspondence directly through the Superintendent of the Department or the officers of the Society, usually with the understanding that all moneys earned by the child over and above what is required for personal expenditure shall be forwarded to those officers to be placed to the credit of said child. Supervision along these lines entails a considerable amount of labor and responsibility. At the same time, were it not exercised, wages earned would be expended often very foolishly as soon as received. Many of the wards have very fair amounts to their credit in the bank. These arrangements apply especially to the elder children and young people. Foster-parents who adopt children in infancy, or of tender years, and who board, clothe and educate them, giving them at the same time the love and affection of a true parent, are entitled to receive, if they require it, loving care and consideration from these children in later years without the question of remuneration even being discussed. Of course, it is expected that every sensible, kind-hearted parent or foster-parent will provide in a reasonable and suitable manner for his children, or foster-child, as they approach young manhood or womanhood. Many of our foster-parents are doing this, placing money in the bank to the credit of their foster-children, sending them to High School, giving them trades, etc.

Adjusting Difficulties.

Discontent or dissatisfaction, either of foster-parents or the children in their charge, is a constant source of anxiety to those who are responsible for the welfare of the latter. Sometimes a foster-parent complains bitterly about the conduct of a certain child. If the home is known to be a good one the wise Visitor may agree very sympathetically with all this, and quietly remark that the circumstances appear to demand a transfer, and that probably speedy arrangements had better be made for the removal of the offender. In nine cases out of ten a statement to this effect will in a short space of time produce an entire change in the situation, the good qualities will be brought forward for consideration, and the parent will hasten to say, "You mistake me; I had no idea of parting with my child, but I thought if you knew the faults you might, by an earnest talk, improve matters." All of which tends to prove that a true affection, even for a wayward child, soon springs up in the heart of the average foster-parent, though patience may often be sorely tried.

Much the same thing occurs in the case of children; they become discontented and restless, think they might do better elsewhere, and often this feeling is fostered by the unwise remarks of neighbors. At this crisis a letter from the Superintendent of the Department, or the Secretary of the Society, or the call of a Visitor, whereby causes of discontent (and these are often very trivial) are aired, and remedies suggested and agreed upon, prevents a "runaway" escapade or the "drifting" of an older child from place to place and from bad to worse. If discontent continues it is always advisable to transfer the child or older boy or girl to another home. The writer has in mind at the moment several children who have been tried three or four times in different homes, and at length found one where they were perfectly contented and were satisfactory to foster-parents. In the former homes there was evidently incompatibility of disposition or uncongeniality of some kind, or in other words they were "misfits," or square blocks in round holes, or *vice versa*.

Injudicious Training.

Injudicious training, in homes that otherwise may be considered most satisfactory, is occasionally a source of trouble. Some foster-aparents are too strict and expect too

Looking Out Upon Life.

much of their children; others are over-indulgent, and the friendly Visitor who has gained the confidence and esteem of the family, is in a position, the result of well-earned experience, to offer advice, in either case, which will carry with it conviction and a certain amount of inspiration to duty.

An instance of this kind occurred a few days ago. A beautiful little girl, only about six years of age, healthy, vigorous, and with a most determined will, had been "returned" by the foster-mother, much against her will, as uncontrollable. The foster-father was absent at the time. When he returned they were both so lonely without the child that in less than a week the foster-father drove several miles, and as the little one had not been "placed out" in the meantime, brought her home with him. Within a day or two the Visitor called. In this case he happened to be an esteemed minister of one of the large denominations, whose position and personality would naturally carry with them considerable influence. The case was stated, a lengthy conversation ensued, and finally the foster-father, who had made no attempt, in the past, to *rule* the child he so dearly loved, agreed to take the matter in hand and assist his wife in every possible way to master this strong will.

From the standpoint of the children supervision is simply invaluable. They have been so neglected in their earlier years that their hearts and minds are like pastures overrun with noxious weeds. Then their inherited evil tendencies are so numerous and so unrestrained that it is impossible for them, at least at the outset, to be what is, in the ordinary acceptance of the term, called "good." Indeed it is often a matter of surprise for those interested in the work to note how patient and considerate some of our kind foster-parents are in dealing with really naughty, trying, and even depraved and degenerate, boys and girls. In a home of this kind, perhaps, things have reached a climax, when, at the opportune moment, along comes the Visitor, and by a firm reprimand, an earnest talk, a hint of removal if bad conduct continues, or the promise of an attractive gift, the culprit breaks down, expresses sorrow, and there is a new beginning. The foster-parent who is really waiting for a chance to relent, agrees to "try again," and a better relationship for all future time is established.

Unsuitable Homes.

Occasionally, not often, we are glad to say, by a combination of circumstances, usually through an undeserved recommendation, given thoughtlessly by an individual who is really ignorant of the conditions and surroundings of the home in question, a child is committed to the guardianship of unsuitable foster-parents, or is placed in what may be described as a "poor home." As soon as the circumstances are known, the Visitor acts immediately, and removes the child, sometimes upon very short notice. The thoughtful person will understand that there are many degraded and defective children who cannot command "good homes," and these must be provided for in the most desirable way possible. Unpretentious homes are often the best if the moral tone and influence are good.

The ideal arrangement in the foster-home system is that every child under guardianship shall be visited once or twice, if possible, in the year; also, that every home shall be visited before a child is placed in it. This is, or should be, the aim, and all the methods employed should ever and always keep this object in view.

Local Supervision.

A large amount of visiting is undertaken by the officers of the local societies. There are in the Province some sixty to seventy Children's Aid Societies, actively engaged in dealing with the dependent and neglected children in their various localities. Many of these have their centres in large and populous cities and towns. Applications for foster-children are received at the various offices and a certain amount of supervision is exercised, especially over the Society's own wards. Some of these local officers, or agents, besides the special work of home-finding, placing and visiting

children in their own counties undertake a certain amount of visiting for the Department. Apart from these, there are several friends whose entire time, especially in the summer, when the season is more suitable for travelling, is engaged in overlooking the interests of our large family of, probably, more than 4,000 children and young people. Others are occupied in home-finding, or in looking up special cases of neglect, cruelty, etc., of parents.

The division of the province into counties is made the basis of this work of supervision, and each general agent is responsible, to a certain extent, for the welfare of the wards in a certain county or counties. Our Visitors go in a friendly spirit, keeping officialism well in the background, and without appearing to be inquisitive, offensive, or critical, they in a short time acquire a comprehensive grasp of all that is necessary for them to know regarding the privileges and advantages at the disposal of the child in the way of educational, religious, or moral training; what are the enjoyments, comforts, influences and companionships afforded in the home, and what are the general conditions and surroundings.

The Visitor.

The visitor acts as a confidential advisor to the child, and time and time again, when a boy has left his home in a fit of temper, or because he thought he was unjustly treated, he finds his way to the Superintendent of the Department or the visitor and is persuaded to return; or the case is fully investigated and, if advisable, a new home is provided.

The children are encouraged to write to their official guardians, or the Visitor of their particular home. In this way those specially interested in particular cases are kept in touch with them and much mischief is prevented.

One of the assistants in the office of this Department is occupied in preparing lists of the wards in the various counties for the use of the visitors; in noting reports of visits made and in informing visitors of new placements and the transfers and changes made in their particular districts.

A few of the reports received may be of interest here.

EXTRACTS FROM VISITORS' REPORTS

Foster mother was glad to see visitor. After some conversation she said: "I have yet to discover a single fault in this boy." "And you were a public school teacher before you were married?" "Yes!" she replied. "Well," I said, "he must be indeed a good boy." She laughed heartily.

Visitor saw both foster-parents who report that J. is a smart girl of fine and loving disposition and quick to learn. She was at school when call was made. Something had been told the child by companions about where she came from, so, about a week or two ago, when this happened, foster-mother had a heart to heart talk with her, telling her how she came to them when she was a little child. The little girl put her arms around her mother's neck and said, "Mother it will make no difference to my love." The child takes such a large place in their hearts and home that there was some dread lest this should not be the case.

One of the agents, after visiting a dozen foster-homes, wrote out his report the same evening, and added: "I have simply been delighted with every home I visited and would be glad to be adopted myself in any one of them."

Another visitor reports that in one trip he found three foster-children who had been ill for considerable periods and under the doctor's care. For one child the expense amounted to over two hundred dollars, while in both the other cases the extra expense was from fifty to seventy-five dollars. The people, though not at all wealthy, were carrying these burdens because of their love for the children and their desire to in every way possible discharge faithfully the obligations they had assumed.

This girl is modest and lady-like in conduct, only she appears rather nervous, though foster-mother thinks she is growing too fast. She is an invaluable helper in this house and foster-parents praise her in fondest terms and say her progress is the very best. She has had training that has developed in her a pride in being neat, clean and thorough in her work as well in originality and self-reliance. This is a Christian home of intelligent love and sympathy, and she attends church regularly. This is a girl of noble ambition and beautiful character, a tribute alike to foster-home and the C. A. S. She has a desire to learn millinery and has so good natural talent in this line that she trims her own hats and does them well.

This little girl is one of our fortunate ones, the visitor thinks. She has a beautiful home, kindly foster-parents, and has every care given her that is possible. Mrs. .P has no complaint to make whatever about the child. Eileen, as they now call her, came in from school while visitor was there. Her manner betokens the good up-bringing she has had. She is most refined and lady-like in her ways; has had no serious sickness of any kind, and certainly looks quite well and strong. The people appreciated my visit.

V. H., age 6, a bright boy, strong, healthy and happy-looking, who talks like a lad of 10 years. Foster-parents have no children of their own, but have a comfortable home and are intelligent, good people. They treat the boy with a consideration that is evidently prompted by genuine love. Everything about the house was all that could be desired, and I am well pleased with his home. This child's lot is cast in a good place.

P. V., age 17. In good health and is a big, fine-looking girl for her age. She is reported to be a good worker and is a sensible, steady girl of good manner. She has received in this home good moral and religious training, and has become steady and reliable, good at cooking and housework and is both clean and neat and industrious. The character of the home is a good place, where industry, economy and truthfulness would all be taught. There is some probability of her going to Toronto and, being ambitious, she might resent official visiting, but be much helped by some sympathetic Christian woman inviting her to her home and helping her as a stranger in the city.

After personally interviewing about 30 children and their foster-perents, a visitor sent the following encouraging summary, in addition to a detailed account of each child: "I have just returned from paying a lot of visits to children in different parts of the County. All the homes seem to be particularly good, I wish you could see the lovely surroundings the majority of the children have and how they are loved. It has done me a lot of good and has set me thinking frequently what would have become of these helpless children had it not been for the Children's Aid Society. I have been received well everywhere and pleasantly invited to call again."

This girl has fallen into good hands, as she has an excellent home. At first Mrs. F. just intended to hire her as help, but now she is desirous of giving her more education. Before coming here she had to work hard and got very little schooling, but Mrs. F. is now teaching her at home and the girl is making considerable progress. After Christmas she will be sent to school. Foster-mother has already cared for and educated two other girls; one is teaching in the West and the other is a nurse. When M. came to this home she had very shabby clothes, but Mrs. F. has fitted her out with everything she needs, and the girl could not earn enough to buy the clothing she now has. M. is indeed a very fortunate child to be placed in such an ideal home.

A BOY'S LETTER.

Many interesting letters are received, and the following from a ward of the Industrial School, aged 13, is worth glancing through:

Dear Friends,—I received the card you sent me. I have a very long letter to write to you. I like my home splendid. I enjoyed my Christmas and hope you enjoyed yours. Well, then, Christmas Eve I scampered off to bed very fast and slept fine, but visions of good things were dancing in my head. I was up bright and early in the morning to see what Santa had brought to me. I made right to my stocking first. I pulled out a pop-gun, oranges, nuts and candies were the next; popped with my little gun for an hour or two, went out to the barn, put hay down for the horses and cows, ran in, washed and sat down for breakfast, then had lots of sport and fun, then out to the barn again and finished up all the chores so I would not have to do them in the evening. Had a good time that day and done my usual work and more of it. Our Christmas tree was held at the Sunday School, flew around and got all ready, then the lot of us piled in the big bob-sleigh, there were six of us, we arrived at the hall safe and sound, then put the team in the shed, then upstairs just in time to get our supper. The concert part came in with songs and dialogues and organ pieces; then the chairman said: "Next on the programme is to strip this beautiful tree that has just grown this afternoon with presents for all good boys and girls, men and women." I got a bag of candies and nuts then a handkerchief and a game of cards, and ended up with blue-bells. So good-bye for this time.

ENCOURAGING LETTER FROM A FARMER.

Here is a sample of the friendly, helpful interest taken by many foster-parents in the children placed under their care.

Dear Sir,—Among my many failings one is that I am not much of a writer. I suppose the majority of farmers do not make a practice of writing more than is really necessary. This is at least true in my case. I received your letter to-day asking how A. is getting along, and in reply will say that I can report most favorably. He is becoming handy in more ways than one and I have hopes that with great care he will become a man who will make a good living for himself some day. When he arrived he was a boy of very singular disposition. If I had not been informed of his ancestry I would not have been able to have tolerated him at all. He not only was untruthful but also commenced to steal, and for a time several articles around the house changed hands. I might say that I was forced to punish him severely for this latter on one occasion, and although that was almost a year ago, I have never known him to steal since. In that case it required just what he received to conquer him, for to punish him lightly proved only to make him sulky and unpleasant. I might say that only in a few cases have I ever known him to lie since he received that whipping and I have never had to punish him again. I have used the most careful judgment in regard to his disposition and believe that he will be a fine young man. We are endeavoring to teach him to save, and have given him money in small amounts from time to time and he appears to wish it laid away to start a bank account. Last year he was not much more than a bill of expense, but this year I am satisfied that he has done much better and will be satisfied to enter into another agreement if you are satisfied.

HOMES ARE AVAILABLE.

There is still room for much greater organized effort in the direction of home-finding, for experience has amply demonstrated that good homes are found in proportion to the amount of effort that is put into the finding of them. Many clergymen and social workers in rural districts would gladly co-operate in this important work, and while there are available homes for the seeking, it seems more than a pity that institutions for children should be constantly enlarging and new ones erected here and there.

TAKING UNATTRACTIVE CHILD.

Although a large number of the requests received for older children are apt to be more or less selfish, it is a pleasure to say that applications such as the following are not infrequent:—

"Dear Sir,—For some time we have been considering the adoption of a little girl. We scarcely feel able to undertake the care of a delicate child, but a plain or even homely face would, I think, make her almost more dear to us and such a defect as the hare-lip you mention would be no drawback."

In response to this appeal, we instructed a worker to call and make enquiries and suggest a certain child. Her report was:—

"Both Mr. and Mrs. W. are very fond of children and desire to adopt one, not from selfish motives, but because they realize the benefit they will bestow upon some life by shielding it from the world. It was mentioned to them that A. S. might be a suitable object of their love and care, and tears came to their eyes as I described her condition and appealed to their love and sympathy for her. They are good, Christian people who, finding it impossible to engage very much in active Christian work, feel that this is what the Lord would have them do—to care for one of His little ones."

The child was sent to them, and now enjoys fine home privileges.

THE WICKED LITTLE BABIES.

The little wicked babies that dare to come in flocks
And overcrowd the flats that fill the overcrowded blocks,
That dare to come a-hungering, with wanton baby greed,
Demanding that they share the food the other children need—
Full sternly must we deal with them—who, sinners from their birth,
Come all unwanted and unbid—mere cumberers of the earth.

We'll shut them up in tenements to swelter in the heat,
Their playgrounds shall be reeking halls, their parks the dirty street,
We'll give them glimpses of the haunts where happier children play
And sow the seeds of jealousy to bring forth fruit some day.
And we will hide our part in this with many a paltering lie,
That they may know they're born to grief, but never find out why.

And oh! the wicked mothers, with the doting mother-hearts,
Who shield the little criminals—who dare to take their parts,
Who toil the dreary years along through sorrowing and need,
To save them from the penalties our justice has decreed;
Shall they uphold the wretched babes in all the wrongs they do?
Shall they protect them from our world, and go unpunished, too?

We'll set them down to entertain that silent Visitor,
The guest who always knows his way to every hovel door,
We'll fill their soul with suffering, and load their hearts with cares,
And teach them how it hurts to want what never may be theirs,
Till there, above the cradle still, with aching heads bent low,
They wonder if it was His will that we have used them so.

James J. Montague.

THOUGHTS ON CHILD LIFE.

The impressions and surroundings of childhood mould the character for better or worse. The slums, the alleys, the evil examples of parents, the presence of dirt, sloth, idleness and dissipation, the absence of restraint, the want of religious and educational influences are responsible for crime and criminals.

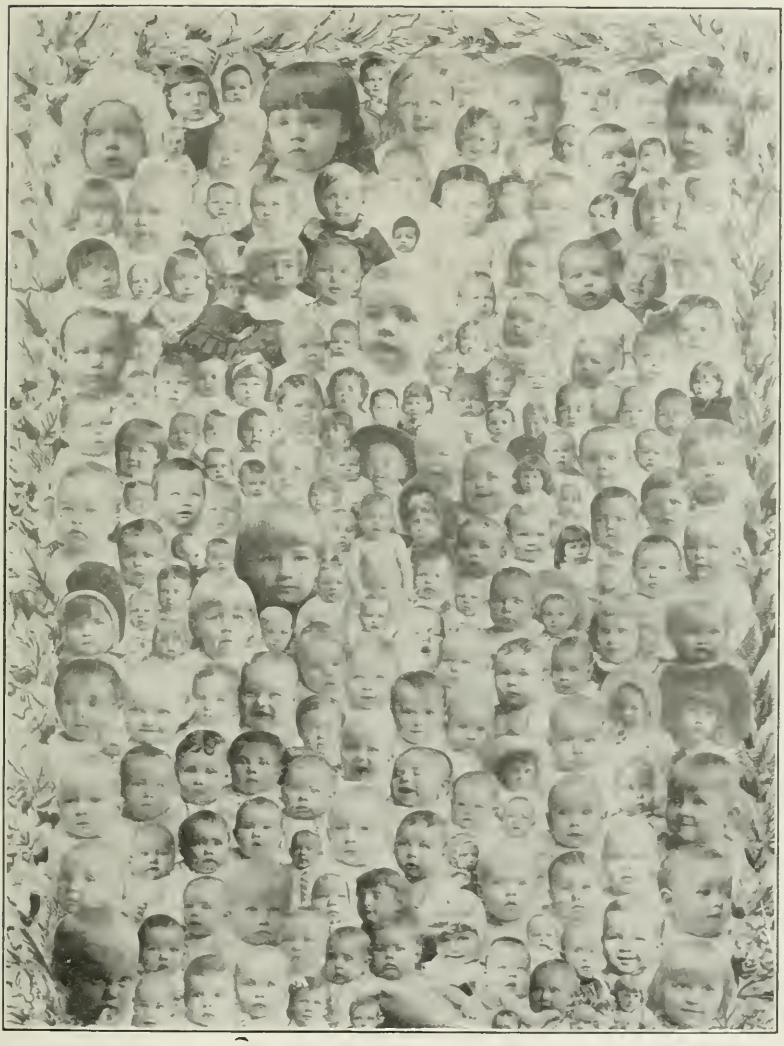
In a quiet way and without much advertising, the agent of the Children's Aid Society visits careless homes, secures the attendance at school of dozens of children who would otherwise be on the streets, and accomplishes far better and more permanent work than can be brought about through any other agency.

A lady who had adopted a baby in the teething period wrote: "Baby has gained two pounds but I have lost five."

Strange, isn't it, that some of these boys who are as adamant to abuse will melt at once before kindly words of friendship and encouragement!

A boy sent to the country recently wrote back: "Please write and tell me how much wages I am to get so I will know how hard to work."

An application was received from a kind-hearted woman in the country who was very anxious to get a baby. Ever since she thought of the idea she had been busy making baby clothes and, she added in conclusion, "I am trusting to God and to you to get me a nice baby right away."



The Coming Generation.

There are times when it is absolutely necessary to sever the parental tie, and yet the highest class of work is undoubtedly that which encourages and helps negligent parents to discharge their most sacred and natural obligations.

One of the County Councils, at a recent meeting, made a grant of fifty dollars to the Children's Aid Society to look after the neglected and homeless children of the entire county. At the same time a grant of seventy-five dollars was made to the town Poultry and Pet Stock Association!

Writes a lad of twelve from his foster-home: "I have a real good boss, for I have been here a long time and he has never given me a licking yet."

If a boy is taught habits of industry, and sees no examples that are essentially vicious in their nature, he will be an honest, industrious man even though his parents were idle and dissolute. It is hard to overcome habits formed in youth and the lad who has been trained to earning his living will, if the opportunity is given him, continue to do so.

It has been well said that "A child is a bundle of possibilities" and much depends upon the training whether the highest type of character will be evolved and the possibilities inherent in the child be fully developed and realized.

A discouraged worker in England said: "Blankets, coals, boots, food, clothes, amusements, medical attendance—there is nothing we have not given, and the more we have given, the less joy, energy, thrift and dignity we see among our people." And this will always be true. It is not charity but opportunity to work out their own destiny under fair conditions that the people want.

A county judge wrote asking for the parole of a boy from the Industrial School, and said: "If he is allowed to come home I will endeavor to keep an eye on him as well as my wife."

The suggestion has been made that there might be authority given to agents of Children's Aid Societies to act as school attendance officers. In many towns and townships no appointment of a truant officer is made, and the law in consequence is a dead letter.

Writing to a Minister of the Crown asking that her boy be allowed out of the reformatory a mother used the following, among many other arguments: "Remember that you were once young yourself and probably did as many foolish things as he did."

An old lady wrote a long letter pleading for a neighbor who wished to get her girl out of the Industrial School, and said: "I am now writing the history of my life and it will be published after I am dead, and if you do not do this you will be showed up in it."

A man who wished to adopt a small boy recently was asked if he would take a special interest in his education and training. He wrote in reply: "Dear Sir,—You may be sure I will do my best to bring him up in the fear of the Lord, and of his new parents."

On another occasion a family who applied to adopt a baby was informed that while they were respectable it was considered that they were too poor to undertake the expense of rearing such a child. The man replied: "Dear Sir,—Have you forgotten that our Saviour was born in a manger and that while on earth He had not where to lay His head."

Strange incidents happen when children are first placed in the Shelter. One little girl, five years of age, was so wild and uncivilized and so accustomed to living like an animal that she would not eat at the table with the other children, but when given food would hide under the table with it.

"I wonder so that mothers ever fret
At little children clinging to their gown;
Or that the footprints, when the days are wet,
Are ever black enough to make them frown,
If I could find a little muddy boot
Or cap or jacket on my chamber floor.
There is no woman in God's world could say
She was more blissfully content than I."

A boy of thirteen who had been badly ill-treated by his own drunken father and had not had the opportunity of schooling was befriended by a well-to-do man in the neighborhood. It became necessary to place the boy under the guardianship of the Children's Aid Society as the father was given a jail sentence, and to the boy's great delight he was placed permanently in the care of the people who had shown such a kindly interest in him.

BAD COMPANIONSHIP.

Annie would have been a good girl if it had not been for Mary, and Mary would not be a bad girl if it had not been for Annie. Put a hundred miles between them and you have two fairly good girls.

WRONGS OF CHILDREN.

One cannot work among these neglected children without unbidden tears often flowing at the recital of their wrongs. Depend upon it when a child goes astray there is a cause for it all—not so much in the child himself as in his home-life—the death of a father or a mother, wrong social conditions, the absence of affection and sympathy, the awful feeling that he is not wanted, and that no one cares whether he does well or ill.

Homes for the Homeless.

One thing that philanthropic people should guard against is this:—See that the walls of an institution never become a prison to shut a homeless child away from adoption into a respectable family.

Babies always make a special appeal to the mother-heart, and there is some good woman waiting somewhere to do her duty in mothering the orphaned or deserted little one.

There is a steady demand for young children for adoption, and homes can be found in this Province for every child that is ready to go out in this way.

NOBODY'S CHILD.

Society's Way—

Poor little wretch! But it must be fed
And clothed, of course, although if 'twere dead
'Twere better, we know. And now let's see:
We'll give a concert for charity,
And hire a star, if we can, to sing.
But wait, I've thought of a better thing,—
A masquerade,—I've a love of a gown,
And I! I'll pose as the belle of the town.

His Way—

A shameful act, and more, a crime,
To foist a child without a dime
On the burdened world! "It can't be helped?"
Then the poor man's brat, conceived and whelped
In a human hutch, we'll say, or worse,
Must ever clutch the rich man's purse,
And hang like a stone upon his neck,
Well, well, good day, and—there's my check.

Her Way—

O poor little child, so pinched with cold!
O poor little child, is there none to fold
And hold you close? And your ceaseless wail,—
Is it just for a mothering, sweet, you ail?
Then share with my little one here at rest
The shelter, the food, and the warmth of my breast.
There's love enough, sweet, in my heart for you,
For God gives all mothers enough for two.

—Rose Turnbull.

Proud of His Accomplishment.

A boy of twelve was given a short term in jail for a minor offence, and so far from regarding it as a punishment he was highly elated. For a long time afterwards his conversation was usually prefaced with the remark. "When I was in jail,"

or, no matter what was under discussion, he would break in with, "We didn't do that way in the jail." In fact, he felt so honoured he wished everyone to know all about it.

Just Like Home.

One day I was walking through a poor district in Toronto with a boy who had been committed to my guardianship from a distant town. We came across a house where the inmates were drunk and fighting and swearing at a terrific rate. The boy listened a few minutes, and then said, "This is just like home."

A Good Rule for Teachers.

All the wisdom in the world is not modern by any means. Here is a rule, written nearly ore hundred years ago by a committee for the guidance of school teachers:—

The master shall study and endeavour to win the love and affection of the children, thereby to invite and encourage them rather than by correction to force them to learn, reason as well as experience having plainly shown that too great severity does rather dull than sharpen the wit and memory; and such education, being slavish, is the principle cause why many children rejoice at opportunities to neglect their learning, which they find to their grief and vexation when they come to years of discretion.

Wise Little Japs.

The Japanese are justly credited with using excellent judgment in adopting the best features of European institutions and customs. Not long ago the prospectus of a new reformatory for boys set forth the wise rule:—"This school is to be organized closely on the family plan, and the discipline and instruction will be conducted within an atmosphere of sympathy and affection. The main reliance shall be placed upon moral influence, and only when this is of no avail shall the children be subjected to discipline."

A Handicap.

Charitable institutions have this great advantage over Children's Aid work. They are always in evidence, whereas the Children's Aid Society by dealing thoroughly with rags, beggary and destitution among children makes it difficult for the unthinking public to realize the need for its existence. Probably this is the reason why large endowments and bequests almost invariably go to institutional work.

The Younger the Better.

It is the general experience of Children's Aid Societies and all institutions for placing out children that, given a good home, the younger the child the more likelihood is there of satisfactory results. A child over twelve years of age has

certain fixed habits of thinking and acting. These, when wrong, are difficult to eradicate. Besides, a child of that age is usually looked at from the point of view of how much assistance he or she can be in the household or elsewhere and valued accordingly. A very young child can be of no assistance, and is not thought of in that connection, except as a far off possibility. In the meantime, the very weakness and helplessness of a young child appeals to the tenderness of foster-parents, and the result is usually a good home for the child and thorough satisfaction on the part of those with whom it is placed.

Loved the Little Fellow.

A man and wife having no children, adopted a boy of two some years ago. Later on they had a child of their own, and the wife then decided that the adopted boy should be returned. The man, however, was desperately attached to the little fellow, and it was only after a good deal of family bickering that he consented to give him up. As a special favor, he asked that he might have the privilege of selecting the boy's new home himself, and for weeks he diligently enquired until he found a family willing to adopt the child. He is now able to see him occasionally and note his progress, but in writing telling about the completed arrangements he said:—"You can't imagine how hard it was for me to part with him. It was the hardest thump I ever got."

A Pioneer in Child Saving.

Charles Dickens, in a letter to the *London News* in 1846, in speaking of the introduction of Ragged Schools, said:

"It was an effort to introduce among the most miserable and neglected outcasts some knowledge of the commonest principles of morality and religion; to commence their recognition as immortal human creatures before the jail chaplain becomes their only schoolmaster; to suggest to society that its duty to this wretched throng, foredoomed to crime and punishment, rightfully begins at some distance from the police office."

Parents Deaf Mutes.

Among the boys recently sent to the Industrial School was one whose parents were both deaf mutes, and this was largely the reason why he had to be committed, since they were unable to direct and control him. Probably what the boy needed was not institutional care, but a home with some relative or friend who would be able to understand him and give him the attention that all boys require.

Leading Girls Astray.

There are so many cases where girls and young women of good intentions but limited experience are led astray by evil men that it is an imperative duty to warn them of the great danger they incur in listening to strangers who profess friend-

ship and are kind and attentive in order ultimately to lead them from the path of honour. Hundreds of beautiful lives have been wrecked by turning too readily to these chance acquaintances. As a rule the men escape while the poor victims, whose characters they have destroyed, bear the entire disgrace.

Mothers and teachers should earnestly entreat young girls to be careful in the choice of associates and to realize before it is too late the sad consequences of permitting undue familiarity. They should be urged to select friends with the greatest care and to repel at once any suggestion of evil, for only in this way can peace and happiness be assured.

Principles of Reformation.

Nearly every youth who has been in a prison leaves the institution with a feeling rankling in his breast that he has been unjustly treated and that the constituted authorities are his enemies. Under this conviction, and actuated often by motives of revenge and hatred, fresh crimes are committed and a lawless, reckless career is sometimes continued over a long period of years, frequent trials and commitments only tending to deepen this feeling of hostility. Punishment does not bring about reformation. Institutions do not always exercise an ameliorating influence on character, and if the youth is to be restored to good society and to an industrious life it must be by changing the current of his thoughts and getting him into a friendly relationship with the world in general. There is only one way in which this can be done, and that is by giving him true friendship and regard—helping him, not with advice or gifts, but with a comradeship and a sympathy that he cannot fail to understand. When a youth has done wrong the main effort should be to develop in him a spirit of true repentance and then give him a fresh start under cleaner and more inspiring auspices.

By-and-Bye the Reaping.

In work for children there are often apparent failures, which discourage and depress the worker, but if faithful and painstaking effort has been put forth in their behalf the good seed may remain dormant for years and then spring into life as powerful and controlling forces for good. In this thought there is much that should bring comfort and lead to hope and perseverance even when the outlook seems darkest. In the early days of this work a girl for whom much had been done was apparently entirely dead to any good influence. In spite of the help and entreaties of friends, she broke away from all restraint and acted so badly that she was twice sentenced to confinement in the Reformatory. After that she disappeared and was believed by all who knew her to have passed beyond reclamation. But a short time ago it was my good fortune to learn that she had repented of her wrong-doing and after a time had happily married. She now has a comfortable home and a good husband, and much of this is due to the apparently wasted effort of friends in her earlier years. Many young people turn a deaf ear to all good advice, but they cannot entirely free themselves from the interest and kindness of those who have their best welfare at heart, and as they gain in experience and age these thoughts come back to them with redoubled force. Could we trace the final results of all our efforts to impress upon children the beauty of a good life we would, I think, find that nothing is lost, but that sooner or later the good will prevail.

Many sad reflections are awakened by reading the following poem, given as the introduction of a pamphlet, descriptive of its work, issued by the Ohio Reformatory for Young Men, at Mansfield:

OUR ONE THOUSAND.

One thousand cells,
  One thousand souls,
One thousand names
  On crime's sad rolls;
One thousand schemes
  That "ganged aglee,"
One thousand slaves
  That might be free.

One thousand youths
  That went astray,
One thousand homes
  Where women pray;
One thousand dreams
  That vanished are,
Or darkly dimmed
  By prison bar.

One thousand terms
  That end at last,
And all the clouds
  Are overpast;
One thousand hopes
  With purpose strong
To do the right
  And shun the wrong.

May every hope
  Fruition find
And time and faith
  To them be kind,
As forth they go,
  With flag unfurled
And valiant hearts,
  Into the world.

And may they climb
  From out the deep
And scale the heights,
  However steep,
That stands between
  This land and night
And that where shines
  Eternal light

Healthy Amusement for Boys.

From City Streets to Island Shores.

PLAYGROUNDS.

Playground vs. Lockup!

A boy's character is formed as much on the playground as in the schoolroom, perhaps even more so, for in amusements his individuality comes out more strongly.

Why not substitute vines, flowers and shrubs for ash heaps, bill boards, rubbish and other things offensive to sight and smell?

School buildings should be opened more extensively to the people for social centres.

Small children wearing glasses are getting to be a common sight in this country. A traveler in Germany writes that at a children's picnic, where twelve hundred boys and girls were assembled, only two wore glasses. This he attributed to the open air play life.

The child must have room, means and opportunity to play, or its physical being suffers and its mental faculties are correspondingly affected. As well deny air and space to the growing plant as deny the same advantages, together with active bodily exercise, to growing boys and girls.

Those who have the fewest natural advantages are those upon whom the loss of a place in which to play bears most heavily.

The larger our cities become, the more and more does the danger to the cities' children increase. The vacant lots get gradually occupied, the "commons" disappear, and the children are driven into the streets.

Boys' Clubs organized by the right people and with the right ideals can do much for future citizenship. They hold the youth at a time when the natural tendency would be toward wildness and excess. Boys must have companionship and play.

Provide for the children of to-day a pleasant, happy and healthy childhood, and thus materially reduce crime, misery and physical deterioration.

Apart from the beautiful environment which ample playgrounds afford, will not our children and those of our foreign-born citizens best learn to work together in concord, if first they have learned to play together in peace?

Orphanage Boards can do a good work both for the children and the community by providing equipped and supervised playgrounds.

There should be a play specialist apointed in every large city to put intelligence and enthusiasm into the movement for helping young people to secure proper outdoor enjoyment.

In addition to the many corners of public parks that could be turned to good account, there are also a large number of gardens and vacant lots whose owners would cheerfully assist if approached in the right spirit. Thousands of children are now debarred from harmless outdoor pleasures because of a three-foot fence and a locked gate on some unused property.

The success or failure of the playground movement depends not so much on the size of the grounds or their equipment, as the spirit that animates the management. Just as there is energy and enthusiasm on the part of the youthful participants, so also must there be a kindred spirit in the supervision and direction. While it is important for the Parks Commission to provide the grounds and fit them for their purpose, it is equally necessary to have supervisors to encourage and guide the children and growing youth in their amusements.

The supervised playgrounds already established have fully demonstrated that youthful happiness can be easily doubled by a small expenditure for swings, slides, etc., and the appointment of a supervisor who can enter into the spirit of the delightful games that from disuse have almost passed out of existence.

The hearts of children go out in grateful affection to those who show a willingness to participate in their amusements, and through directed, well-organized play they can often learn more than in the classroom.

Let children get a sane mind in a sound body and clean heart in a clean body.

Play is at present almost the only method of physical development for city children, and we must provide facilities for it if we would have the children strong and law-abiding.

Where Happiness Abounds.

A few small playgrounds are better than one large one.

Children generally get into trouble through lack of opportunity to expend their surplus energy.

Children are the great asset of the country, and nothing should be left undone to give them rational enjoyment and wholesome physical training.

Wellington said that "Eton won Waterloo." At this historical school the boys were encouraged in manly sports.

Every city should provide breathing spaces where children can make a noise without being scolded.

Children should be taught to play as they are taught to read and write.

Healthy enjoyment should never depend on the possession of wealth. The fact of being a child is the all-sufficient reason why every facility should be provided.

Early happy life always serves to keep the heart young.

Pitch and Toss.

CHILDREN IN RURAL DISTRICTS

IN PAST YEARS the great bulk of philanthropic effort has been confined to cities. Naturally so, because organization is much simpler and financial support is more readily obtained. Social conditions are evident to all, and where there is distress or poverty relief is sure to be promptly extended. If there is vice or wrongdoing the public eye is equally certain to discover it, and, except where long usage has made evil commonplace, action will be taken to bring about improvement. In the country, where people are scattered, there is no public opinion and no effective organization to relieve the individual complainant from personal responsibility. Then, too, rural municipalities do not contribute much to benevolent causes, and the generously disposed usually send their gifts to popular city charities.

This means that an important social work is left undone, and too often vice flourishes, and careless, degenerate families of children grow up to be a burden and a menace to the community. Few people realize how serious this problem is, or what an expensive and vexatious addition this means to the dependent and criminal population.

Tramps and Vagrants.

I once made the statement in a public meeting of social workers that many tramps, vagrants, and other undesirable characters, were born in the country and afterwards gravitated to the city. This did not meet with the general view, as the majority believed that nearly all criminals and vicious persons were the products of the city slum, but I still believe that a large proportion of unfortunate characters come from the Ishmaelite class in the country. When the neglected child of the rural district reaches the age of fourteen or fifteen he almost invariably commits some offence that brings him within the pale of the law, and then he either voluntarily or by compulsion disappears from the neighborhood, drifting to larger cities, or tramping about from place to place without home or occupation. Few people realize how many cases there are of this kind, both male and female, because so little attention has been paid to the subject.

Worst Cases from the Country.

Without doubt the worst cases of immorality, incest, cruelty and neglect of children, in my experience, have been in the country. In the cities and large towns there is a strong Christian sentiment and greater social activity. People are better educated in right living, and any serious lapses from the right path are quickly reported and the necessary corrective measures applied. In the rural districts there is no such public sentiment, no united social activities, but, on the other hand, there is the toleration that is often inspired by fear of personal harm. Undesirable characters in the neighborhood are sometimes well and unfavorably known throughout a large area, but no one can be found to lay an information for fear of injury to their person, their stock, or their property.

A Group of Children Before and After the Children's Aid Society Took Charge.

Grow Up Without Education.

The school attendance law is rarely enforced in rural districts. Here and there some vigilance may be shown, but as a rule, if parents are indifferent, and do not take the trouble to send children, they are allowed to do as they please, and the children not only grow up with vicious example and surroundings, but lose the beneficial and counteracting influence of school life. Not only is there this lack of effort to get children to attend, but many cases occur where neglected children have been encouraged by the school teacher to stay away. Such cases have happened in my experience. Children from a neglected home, if they should happen to turn up at the school untidy and verminous, do not receive a welcome. Other children taunt them, and the teacher, for the sake of the better class of children, tells them to stay at home until they are cleaned up, which practically means banishment. Owing to the bad example at home neglected children use bad langnage and are a menace to respectable children, and in the country it is rare that any definite steps are taken to lift them out of their evil environment. For these conditions the children themselves are not responsible, and yet, unfortunately, they bear all the reproach, and any incentive they might have to a better life is crushed out by their treatment.

Ignorance of Law.

In most rural districts there is great ignorance as to the law, and the village, or rural, constable is usually a man of all work, who has taken on this extra duty to add a little to his income. Clergymen and church workers have never had opportunity to study social reform work, and are sometimes as innocent as babes as to the real evils that exist in the world. A rural clergyman, long engaged in the ministry, wrote me concerning a notoriously bad woman in his neighborhood—bad because she was feeble-minded—and said: "I am afraid Miss ——— is not very respectable, for she has had four or five children, although she has never been married." Others have approached grave social dangers and moral pests in the community with the same timid and hesitating method of introduction.

On another occasion a clergyman wrote me that there was a vile resort in his district, and that all the respectable farmers would drive a mile or two out of their way to avoid seeing and hearing the evil-doing that went on there on Sundays when the wild youth of the neighborhood would gather to carouse. "Instead of allowing the farmers to drive around this place," I remarked, "why not call a meeting of a few of your influential men and insist on them driving through it." "But what can we do?" he asked in astonishment. When it was explained that the parties could be arrested for disorderly conduct and for keeping an improper resort, etc., he eagerly agreed to have action taken, and as a result of a conference and legal advice, the place was raided, several inmates sent to public institutions, or to friends in other districts, and the hovel pulled down so that it could not be used for wrong purposes again.

Physical Defects.

Among the children growing up in poor families in rural districts there are often physical defects in infants and young people that remain unattended to, and the children grow up with imperfections that could easily have been prevented had there been proper medical and surgical care. Feeble-minded children also are found in these families, and when no steps are taken to place them under custodial care they are led astray at an early age, often marry some worthless degenerate, and continue to perpetuate the same undesirable class.

What Can be Done?

All these things point to the desirability, nay, the strong necessity, for better organization, greater vigilance, and more practical measures in eliminating from our rural districts the ignorance, crime and degeneracy that now exists. Many of these families need sympathetic encouragement. They have been given a bad name, shunned by the rest of the community, the children growing up recognizing that every man's hand is against them, and naturally they develop all the badness that is expected from them.

If there could be travelling social secretaries, who could organize social work in towns and villages, create the right kind of public sentiment, and deal radically with extreme cases, that would all be in the right direction.

I have often thought that if instead of appointing constables for purely detective and punitive work, we could have social upbuilding and preventive work as their main duty the results would be much more satisfactory. Above all, more attention should be given to education in rural districts, for if children can be kept steadily under the beneficial influence of the schoolroom during the formative period of their lives their prospects for future usefulness and happiness will be materially increased.

Village Amusements.

There is a great lack of rational amusement and recreation in the country. Every small town or village should have a social centre building and a good playground. To give young people in the country some variety in life and relief from the monotony of existence, it is extremely important that more attention should be given to the social side of their natures. Too often the boys hang around the country hotel as their only resort, and form drinking habits from the simple and natural desire for sociability. The young girls do not do this, but they are equally in need of the joys of existence. The village playground, and above all a director, giving all his or her time to the work of recreation, would to some extent meet the social need. A social centre building, with club rooms and hall for concerts, dances, etc., would exercise a healthy, pleasure-giving influence that would offset to some extent the deplorable exodus to the cities. If municipal councils and philanthropists would take this project up they would be doing the highest kind of service for the community.

Co-operation Desirable.

Wealthy and influential city charities should take some oversight of the near-by rural district. Some charities actually draw a line around the city and refuse to touch any case, no matter how urgent, that happens to be outside that line. This is a narrow and short-sighted policy, as it is really the duty, as it should be the privilege, of all charities receiving money from the public to take cognizance of the needs of the surrounding territory. One often hears the excuse, "We have received our funds from the city, and what right have we to spend any of it in the county?" and it is doubtless true that county and town councils have been extremely parsimonious in making grants for social or charitable work; but at least there should be constant educational work carried on until the necessary funds are secured to cover the much needed rural work.

What is Being Done in Ontario?

It would be a mistake to say that we have found the solution in Ontario, for there are many districts where much remains to be done, but it is at least true that some effort has been made through this office to cope with the need. The mere fact that our Children's Aid system covers the entire Province, and is a uniform and co-operative plan is in itself unique. Outside of many individual workers and correspondents, there are between sixty and seventy Children's Aid Societies actively engaged in work for the protection of children, with all the social uplift that such work implies. Further, there is the important fact that this united work centres in a head office in the Government Building at Toronto, to which the people everywhere in the Province are not only invited, but urged, to report any cases of child neglect, so that proper steps may be taken to bring about improvement. No matter what the complaint is, or how far distant it may be, steps are at once taken, and the case is not lost sight of until there is decided improvement. In addition to the many Societies and Committees and correspondents—any one of whom is ready to give assistance when requested—there are, in various sections of the Province, inspectors of Children's Aid Societies, who, as representatives of the central office, are prepared at any time to go anywhere when instructed to make these special investigations. In addition to this there is a special officer attached to the head office, who is constantly on the road enquiring into the cases that are reported to the Superintendent. In this way many families are warned, encouraged, or put in the way of timely assistance; immoral and vicious conditions are broken up; children are removed to a new environment—when that is evidently the best thing to do—and at all places touched upon the agent or inspector endeavors to interest influential residents in child-protection work. From the office literature and letters, requesting co-operation in the great work of lifting up the social status of the people, are sent out daily, and every possible effort is made to create new conditions of moral wholesomeness and material prosperity, where formerly existed degradation, poverty and despair.

CHILDREN'S AID SOCIETIES.

THE STORY OF THEIR GOOD WORK WOULD FILL MANY VOLUMES.

THROUGH the instrumentality of the Children's Aid Society young lives are rescued from the maelstrom of vice and consecrated to useful service in the development of our national life. In preparing this Report as much copy had to be rejected as appears in these pages, so that the half has not been told. All that is possible is to convey some idea of the splendid work that is going on, and to remind the reader that the unseen influence of this movement is something that cannot be tabulated or even described. From numerous reports and letters received the following selections are made:—

AFTER MANY DAYS.

An Agent writes:—"Let me for your encouragement give this incident: With a fellow-worker your Secretary went to a home where we expected to have to take five children, as their mother was dead and father indulged in drink. To our surprise and delight, instead of dirt and confusion we found everything clean, neat and comfortable, the explanation being that a sister, the oldest of the family, had come home and through her efforts and skill this great change had come. What added to our pleasure and thankfulness was the fact that she was one of the first children we had to deal with when the Society was organized. She is now married and has two children. God has surely been good to us in thus blessing our work and showing us such results."

FAITH STRENGTHENED.

One of the agents who recently started Children's Aid work reports that when he took hold the outlook was very poor, and he expected to have great difficulties to contend with, but to his surprise he found that the cause had many friends. In a few days he collected over $100, and in this connection he mentions an interesting incident: As he was walking down the street one day, rather discouraged, a gentleman who was driving past called to him and gave him a substantial contribution towards the funds of the Society, telling him at the same time that he could always apply to him for help when necessary in the cause of the children.

A Friend in Need.

The following is a good illustration of the advantages of the volunteer probation system. A lad of sixteen was arrested for stealing a number of articles from a store, and was committed to six months' imprisonment. Before the sentence was carried out the agent of the Children's Aid Society called on the judge and expressed his willingness to become responsible for the youth if he were allowed out on probation. After some discussion, the sentence was rescinded, the young man handed over to his new-found friend, a situation provided, and so far he has shown himself both pleased and grateful. "A few more people like you," remarked the judge. "would make the work of the court much easier."

Parents Re-united.

The Agent of one of the Societies writes:—"A few weeks ago I went some ten miles into the country to call on Mr. ———, whose wife had left him. The children looked sadly neglected, so much so that I told him he would have to get some one to look after them. I got his wife's address, went over to W——, and talked the matter over, with the result that they are together again, and the children are being attended to properly."

Brought His Gramophone Along.

Another Agent says:—"Charles is now 23, and is located on a Western farm. He is back on a visit, and of his own volition he came to the Shelter with a gramophone and gave the children a good time. His progress throughout has been splendid."

Practical Help to Needy Family.

Complaint was received about a family of neglected children in the northern part of the Province. An Agent was sent to investigate, and he found that the head of the family was only earning one dollar per day, thus reducing the whole party to the border of starvation. By interesting a few friends in the neighborhood a better situation was secured for the man at $2.50 per day, and a number of contributions were made to buy shoes, etc., for the children. The result is that by this friendly intervention the status of the family has been raised, the children are able to go to school properly clad, and there is no likelihood of any further trouble.

Children's Agent a Real Friend.

Numerous incidents come to hand almost daily to show that the Agent of the Children's Aid Society is the real friend of the poor, bringing them sympathy, comfort and practical help in their time of need, and that it is only when there is continued vice and drunkenness and indifference to the claims of the children that action is taken to secure guardianship. Here is an item from one of the reports:—

"Poor family and neglected children reported to be living on O—— Street. Called at once to see them. It was a wintry day and there was no fire in the house and no wood or coal to make one. Nothing to eat in the house but uncooked potatoes. The mother was sick in bed with her two little girls beside her, trying to keep warm. Without delay I secured for them wood, groceries and had both a doctor and a nurse to attend the woman. Three months later received another report concerning the same family and found the place in such a condition of dirt that I went off for the health officer. Got the place cleaned up and a promise that the children would be sent to school. After six visits and no improvement, or effort at improvement, we decided to have the parents before the magistrate for a warning, but instead of obeying they fled from the town. Two months later we learned that they were in a town nearby under another name, and had been living in two different places within a month, the town supplying them with fuel and the charitable people with groceries. They were apprehended and brought before the Court and the children made wards of the Society. Two were given back to the parents on probation and two provided with foster-homes in the country, where they are cleaner and happier than they have ever been before."

REPORTS OF SOCIETIES.

Following is a detailed report of the work carried on by the various Societies:—

TORONTO.

J. J. Kelso, Esq.,

Superintendent of Neglected and Dependent Children of Ontario,
Parliament Buildings, Toronto.

Dear Sir,—In compliance with your request, I have pleasure in submitting the following statement of the work of the Toronto Children's Aid Society for the year ending December 31st, 1910:—

The total number of complaints of neglect and Children's Court cases for the year was 1,569 (52 less than in 1909), involving the interests of 2,278 children (356 more than in 1909).

There were 928 cases dealt with in the Children's Court, being 320 less than in 1909. This satisfactory statement is noteworthy, considering the rapid increase of the population of the City, and may in a good part be attributed to the aggressive work of the Society in following up the juvenile delinquents after acquittal, in their homes, and otherwise retaining an interest in their future welfare.

There were 583 complaints of neglect (259 more than in 1909), involving the interests of 1,203 children (658 more than in 1909), which, with our increased staff of workers, we were well able to attend to.

The cases coming from the Children's Court were disposed of as follows:—

Suspended sentence	540
Fined	161
Discharged and withdrawn	68
To St. Vincent de Paul Society	60
To Victoria Industrial School	65
To Alexandra Industrial School	11
Given to parents	7
To Police Authorities	4
To Institutions	10
To Jail	2
	928

The complaints of neglect, etc., were dealt with as follows:—

Made Wards of Society	24
Assuming custody of children	98
Mediation and advice	192
Warning	165
Lost children returned to parents	8
Discipline	25
Co-operation of other Institutions	46
In abeyance	25
	583

The number of children sent to foster-homes was 36.

Since the Society was organized in 1891, 19,027 cases have come under its supervision, involving the interests of 24,976 children.

The Members of our Board are quite in favor of the proposal to prohibit children visiting these 5c. and 10c. shows, unless accompanied by their parents or guardians.

We have also instituted a campaign against boys under eight years of age selling newspapers and smallwares in the streets late at night, and are convinced that no license should be granted to any boy under ten years of age, and the time limit be no later than 10 o'clock p.m.

Our thanks are due to the Magistrates, Police Force and Court Officials for their ready assistance in anything appertaining to our work in the Children's Court, and in our visitations in the City in cases of neglect and cruelty to children, etc.

And lastly, we appreciate the reports we receive, now almost daily, from your Department of your visitations to the hundreds of foster-homes in which the children of our Society have been placed.

Yours faithfully,

WM. DUNCAN,
Secretary.

Cash Statement for the Year 1910.

Receipts.		*Disbursements.*	
Donations	$11,608 18	Shelter Maintenance, Fuel, Provisions, Light, etc	$3,868 66
Parents Towards Support	552 00	Salaries and Wages	4,372 99
Contribution Boxes	1,157 15	General Expenses, Stationery, Printing, etc.	1,024 63
Civic Grant	4,000 00	Petty Cash, Postage, etc., etc.	625 00
Sundries	28 04	Balance Carried Down	7,454 09
	$17,345 37		$17,345 37
Cash in Bank January 1, 1910	$871 15	Transferred to Special Account "Extension of the Work"	7,500 00
Balance Brought Down	7,454 09	Balance in Bank	825 24
	$8,325 24		$8,325 24

A. M. CAMPBELL,
Treasurer.

The officers are as follows:—

President—J. K. Macdonald.

Vice-Presidents—W. Harley Smith, M.D.; T. Millman, M.D.; R. S. Baird, Hon. Thos. Crawford.

Treasurer—A. M. Campbell.

Secretary and Inspector—Wm. Duncan.

Hon. Solicitor—W. B. Raymond.

Committee—C. P. Smith, Ambrose Kent, C. J. Copp, M.D.; Noel Marshall, C. C. VanNorman, A. B. Powell, James M. Sinclair, Herbert Mortimer, J. M. Foster, Henry Sutherland, R. A. Nisbet, F. W. Gerald FitzGerald, D. E. Hughes, E. J. B. Duncan, Mrs. Wm. Oldright, Mrs. J. J. Follett, Mrs. C. C. VanNorman, Mrs. Jas. Ryrie, Miss Wardrop, Mrs. John Lillie, Mrs. J. C. Fisher, Mrs. F. C. Jarvis, Mrs. A. F. Rutter, Mrs. O. B. Sheppard, Mrs. Ambrose Kent, Mrs. A. E. Dyment, Mrs. C. S. Macdonald, Mrs. W. J. Lovering, Miss Adele Nordheimer, Mrs. James Sargant, Mrs. M. B. Davidson, Mrs. R. A. Nisbet, Mrs. R. F. Scott; Ald. J. O. McCarthy, appointed by the City Council.

By way of comment on the above report it might be said that children are detained too long in the Shelter, with the result that there is a chronic state of congestion. Only thirty-six children were placed in foster-homes, whereas, with so many dependent children in the city, the number placed out should be at least two hundred. A sufficient number of workers is not employed although the Society received during the year $7,500 more than was expended. There is room for a broader and more comprehensive work, and the directors of the Society would do well to consult with other social and moral reform agencies with a view to greater co-operation and efficiency. A well-equipped home-finding department is desirable.

ST. VINCENT DE PAUL SOCIETY.

J. J. Kelso, Esq.,

Superintendent of Neglected and Dependent Children of Ontario.

Dear Sir,—For the year ending December the thirty-first, nineteen hundred and ten, the following statement relative to our Society is herewith respectfully submitted.

From our Agent's Report, received by me, I learn that during the above term 364 cases were brought to his official notice, which concerned 453 children, 228 cases emanating from the Children's Court and 136 from private information.

Of the Court cases, the Police Magistrate consigned 22 boys to St. John's Industrial School, 7 girls to St. Mary's Industrial School, and 4 children were made wards of our Society.

Of the charges against our children the greatest number is of petty theft, and I believe that the frequency of that crime is largely attributable to unnecessary, unwise, tempting and enticing displays of merchandise in our stores.

As a source of far greater temptation and social evil I regret the woeful effects of allowing children under sixteen years of age to attend moving picture shows and like theatrical performances without protection of parents or guardians.

In connection with the Children's Aid Act, I notice some change of Judgeship has been suggested, but the experience of our Officers and Society convinces me that it will be extremely difficult for any other Judge to equal, let alone to surpass His Worship Colonel George T. Denison in the uniformity of his kindness and the wisdom of his judgments.

I have reports from the Government Agent concerning the welfare of our wards throughout the country, with which I am much pleased.

Our Treasurer's report for the year, as submitted to me, is eminently satisfactory.

As stated in my last report, I believe we may felicitate ourselves and congratulate our City for, notwithstanding the abnormal increase in the area and population of

Toronto, and the consequent increase of our field of labor, we have not found it necessary to enforce the Children's Aid Act and deprive parents of their offspring. Rather, we have induced undutiful parents to become temperate and useful citizens and to help us in the good work of caring for those little ones for whom our patron, great St. Vincent de Paul, gave his life.

And above all we desire here publicly to return thanks to Almighty God for the manifold blessings He has bestowed on those who have labored together in behalf of unfortunate children.

Most respectfully,

M. O'Connor.

President.

LONDON.

At the seventeenth annual meeting of the Children's Aid Society of London, Inspector Sanders gave a voluminous report of the work of the year. The Treasurer, Mr. J. I. A. Hunt, presented the financial statement, showing a balance of $600 in the treasury. There was a large attendance of members of the Society. Sheriff Cameron occupied the chair.

In his report, Inspector Sanders stated that during the year the society had broadened out greatly, and had awakened a new spirit of helpfulness and a new conception of the possibilities of childhood and youth, even when most sadly neglected and wayward.

He gave a large share of the credit to Mr. James A. Stevenson, the probation officer, who had done much for the boys of the city.

The "Big Brother" movement had been an unqualified success and had been instrumental in saving many boys. The Inspector also paid a tribute to the value of suggestions given to the society by Mr. and Mrs. J. I. A. Hunt.

Work of the Year.

During the year 110 children passed through Inspector Sanders' hands. There were 14 in the Shelter at the beginning of the year, 21 had been returned from foster-homes, 6 had been delivered by guardians into the society's care, 14 had been given by parents, 16 were taken from the juvenile courts, 6 had been taken off the street, 9 had come from Middlesex County, and 20 from adjoining counties, while 3 Barnardo boys had been taken care of. One runaway made up the list.

They had been disposed of as follows—33 in foster-homes, 20 replaced in foster-homes, 18 were returned to parents or guardians, 5 to outside societies, 1 had been sent to the provincial superintendent, 3 were returned to the Barnardo Home, 11 had been sent to the Industrial School; there were 18 in the Shelter now and 1 at Mount St. Joseph.

The number of children cared for in the Shelter was 107. Of these 15 were in twice, 3 were in three times, and 1 was in four times. The total number of days spent by all the children there was 5,239. There was an increase in the statistics of the juvenile court. The Inspector did not think this a discouraging symptom, but merely showed that greater attention was being paid the boys and girls.

Juvenile Charges.

The charges on which juveniles appeared before the court were as follows: Theft 55, disorderly 75, damage to property 27, vagrancy 7, assault 1, mischief 5, incorrigible 3, truancy 8, neglected children 4, abusive language 2, trespass 6, fraud 1, smoking cigarettes 6, breach of by-law 68. Total, 268.

The sentences meted out were as follows: Sentenced to Industrial Schools 9, fined 50, bound over to keep the peace 1, sentence suspended 38, discharged 170. Total, 268.

The total number of cases dealt with outside the above figures was 408, involving the welfare of 585 children. The total number of interviews held was 2,125, and the visits numbered 357.

"Big Brother" Movement.

Inspector Sanders paid a compliment to P. M. Love and Chief Williams for their co-operation during the year.

Probation Officer Stevenson submitted his report, and it contained an outline of the work done by the "Big Brother" movement.

The Provincial Superintendent, Mr. Kelso, was present and gave a short talk. He congratulated the society on the work being done, and stated that it was in keeping with the good work being done all over the province. He advocated the appointment of a committee to visit the moving picture shows each week and see that they were up to a moral standard. The churches should throw open their parlors and look more closely after the welfare of the children.

Executive and Officers Elected.

Officers and Executive were elected as follows:—

Lady Patronesses—Mrs. J. H. A. Beattie, Lady Gibbons, Mrs. Thos. Coffey, Mrs. C. S. Hyman.

President—Sheriff D. M. Cameron.

Vice-Presidents—Mrs. Yarker, Mrs. Leonard, Jas. A. Stevenson.

Treasurer—J. I. A. Hunt.

Secretary and Inspector—Joseph Sanders.

Assistant Secretary—Helen Tufts.

Assistant Inspector—Adam Maguire.

Honorary Solicitors—Messrs. McKillop & Murphy.

Board of Management—Mesdames W. C. Allen, F. P. Betts, Thos. Baker, Geo. Brown, H. S. Blackburn, T. H. Carling, J. H. Chapman, F. P. Drake, T. C. Duncan, H. E. Gates, J. H. Ginge, F. R. Hardie, F. F. Harper, John I. A. Hunt, J. W. Jones, E. N. King, F. E. Leonard, Talbot Macbeth, Mulkern, A. Purdy, Regan, F. Screaton, E. B. Smith, McGarvey, W. T. Edge, C. N. Spencer, Andrew Thomson, Jas. Thorpe, John Weld, W. E. Wismer, W. A. Young, Yarker, Paddeson, W. I. Nicholson; Misses Bullen, Elliott, Graydon, Gibbons, Boyd, Dora Labatt, Mitchell, Stella Macklin and O'Neill; Messrs. Geo. W. Armstrong, D. M. Cameron, V. Cronyn, Chadwick, T. B. Escott, John I. A. Hunt, Rev. J. C. Inkster, Rev. M. D. O'Neill, Rev. E. H. Peatfield, Jas. A. Stevenson, H. Snell, E. R. Wilson, W. H. Wortman, M. P. McDonagh.; appointed by City Council—Aldermen Ashplant and Tancock.

OTTAWA.

His Excellency Earl Grey came out as a strong champion of the supervised playgrounds for children at the annual meeting of the Ottawa Children's Aid Society, held in the Carnegie Library. "The school playground is almost, if not as important as the school room," said His Excellency, "and should become a necessary part of educational equipment."

At the request of Earl Grey, Mayor Hopewell, who was present, explained the status of the playground movement in the Capital. He agreed with His Excellency regarding the necessity of caring for the young, but regretted to learn that Ottawa came only second. With regard to the playgrounds, the Mayor recounted that a by-law introduced two years ago to expend a sum of money for this object had been defeated by the ratepayers. His opinion was that the matter was not fully understood by many who voted against it, and he thought that a strong educational campaign should be undertaken, and was necessary, before any results could be obtained. He was willing to join hands and help any move towards re-introducing the project.

His Worship urged the society to go ahead and build the addition to the Detention Home. While it was not the time of the year to approach the city for a grant, he was sure that if a deputation waited on the incoming Council and asked them to provide for the expenditure in the Estimates it would be done.

Mr. W. L. Scott presided at the meeting, and the first order of business was the reading of the annual reports.

THE SOCIETY'S WORK.

Mr. John Keane, the Secretary, said that the work of the Society had increased during the past year, and to date from its inception 816 children had passed through its hands. During the year 82 children were taken in charge, as against 67 last year. In all, 93 had been placed in foster-homes. These included several from the previous year. The juvenile court had dealt with 259 cases for various offences against the law. Mr. Keane drew attention to the continued evil effects on the children from the cheap picture theatres. He announced that Sir Charles Fitzpatrick had offered to equip the Detention Home with a manual training outfit, and that one of the public school teachers had offered his services gratis to teach the boys detained in the Home.

Mr. Plunkett B. Taylor, honorary treasurer, reported that a deficit would result on the year. The receipts had totalled $1,431.33, while the expenditures were $1,576.75, leaving a debit of $145.52.

The reports of the probation officers, Miss Cassaday and Madame Bruchesi, were then received.

Two important resolutions were introduced and carried by the Society, Mr. J. F. Orde, K.C., moved, seconded by Rev. Mr. Mavety, that a resolution be sent to the Legislature, making it illegal to reproduce criminal acts on moving picture films.

Col. Irwin moved a resolution, which will also be sent to the Legislature, asking for more stringent legislation governing the sale of drugs and poisons for use as stimulants.

Officers elected:—

President—W. L. Scott.

Vice-Presidents—Sir Louis Davies, Rev. Canon Pollard, Rev. Canon Sloan, Mrs. John Thoburn, Madame Reaume.

Honorary Treasurer—P. B. Taylor.

Secretary—John Keane.

A Ride Home From School.

BARRIE.

The annual meeting of the Barrie Children's Aid Society was held in the Council Chambers, Nov. 29, 1910.

After the minutes of the last annual meeting had been read and confirmed, the Treasurer, Mrs. M. Burton, read her report, which showed that the receipts of the Society from all sources amounted to $604.75, with expenses $532.00, leaving a balance of $72.75, which was considered a very satisfactory year, and surpassed any previous year in the history of the Society by over $400.00.

The Secretary's report showed a proportionate increase in the number of cases dealt with by the Society.

All the officers were re-elected, viz:—

President—Donald Ross, Esq.
First Vice-President—Rev. Dr. McLeod.
Second Vice-President—Rev. I. G. Bowles.
Treasurer—Mrs. M. Burton.
Secretary—A. M. Hunter.

BRACEBRIDGE.

At a largely attended meeting in the Town Hall, Sunday evening, after an address by Rev. C. R. Miller, a local branch of the Children's Aid Society was organized. Dr. Williams occupied the chair and in well-chosen words expressed the belief that, while much depends upon heredity, much more depends upon environment. He based his belief upon observation and investigation in the most congested parts of the Old Land and the sparsely settled parts of the new.

In the election of officers Dr. Williams was elected President, Mr. Thomson White and the resident clergymen Vice-Presidents; Mr. G. H. O. Thomas, secretary-treasurer; and a committee consisting of two representatives from each church. Those elected were: Presbyterian, Mrs. Jno. Colley and Mrs. R. A. Findlay; Free Methodist, Mrs. Fallis and Mrs. Shier; Roman Catholic, Mrs. Richea and Mrs. Barnhardt; Baptist, Mr. H. Slater and Mrs. G. Hines; Methodist, Mrs. McLeod and Mrs. Jewell; Salvation Army, Mrs. Garbutt and Mrs. Alex. McDonald; English Church, Miss M. Wadsley and Miss Leishman.

Forty dollars was subscribed towards the support of the local branch.

BELLEVILLE

The spacious City Hall was crowded to the doors with those interested in the work of the Children's Aid Society, whose annual meeting it was. On the platform were Mr. J. J. Kelso, general superintendent of the Children's Aid; Mr. Thomas Ritchie, president of the local branch; the Revs. R. C. Balgrave, A. H. Orumm, A. M. Hubly, Rev. Robt. Wallace, Principal Colling, Mr. W. W. Knight and Mr. S. A. Gardner.

Mr. C. B. Scantlebury read his annual report and also that of the treasurer, in which capacity he has acted for the last five months, due to the absence of Miss Benjamin.

Receipts, year ending Nov. 1st, 1910—From balance, 1909, $138.02; receipts membership and donations, $507.59; receipts maintenance, $1,467.23; receipts lawn social, $127.08; total receipts, $2,239.92.

Expenditures—Clothing, food, etc., $449.23; salaries, $568.10; sundry expenses, $252.93; for 83 wards, $15 each, cost of maintenance each ward; repairs to Home and permanent equipment, $769.96; total expenditure, $2,040.12.

Total receipts, $2,239.92; total expenditure, $2,040.12; balance on hand, $199.80.

THOS. RITCHIE, ESQ., PRESIDENT BELLEVILLE SOCIETY.

AGENT'S REPORT.

Mr. W. H. Wrightmeyer, the Agent of the Society, then read a highly favorable report of the work of Children's Aid for the year closing October 31, 1910. The following figures speak for themselves:—Number of calls in interest of children, 1,518; personal interviews, 334; letters received, 443; letters sent out, 616; complaints received, 134; children dealt with, 413; court cases, 57; children made wards, 83; children placed in foster-homes, 45; allowed to return to parents, but still under supervision, 18; sent to Mr. Kelso, 9; sent Victoria Industrial School, 4; sent to Alexandria Industrial School, 3; to Sick Children's Hospital, 1; to Home of Incurable Children, 1; children now in Shelter, three of whom are to be replaced, 10.

Mr. Wrightmeyer cited many examples of homes which had been made happy by reason of the fostering of some of the "Shelter" children. The union of separated parents was dwelt upon at length.

"The most gratifying phase of this work," said Mr. Wrightmyer, "is the visiting of wards in their foster-homes. To see their happy faces in wholesome and beneficial surroundings and contrast their present lot with that from which they have been received is truly a reward for the most unpleasant incidents we have encountered. I regret the fact that I have not had more time to devote to this branch of the work.

"Our honored President, Mr. Ritchie, has evidenced great practical sympathy with the work and is a father indeed to the helpless and dependent little ones of our Shelter. I feel also that I cannot sufficiently thank our genial and kindly secretary, Mr. Scantlebury, who has been of invaluable assistance to the agent, his never failing interest and ready advice acting as a stimulant.

"The police force to a man has ably seconded our efforts, and the truant officer, Mr. Arnott, has proved a true friend to the Society, ever ready at the agent's need to accompany him on distant and difficult cases."

Mr. Ritchie read the names of those who have been on this year's executive and also of those who, by their deep interest in helping bear the burdens of the society, and were thus entitled to be members of the executive.

Rev. Mr. Balgrave, in moving the reception and adoption of this report, mentioned his delight in the sudden turn affairs had taken in this city in the interests of neglected children. He was of those engaged in the early beginnings of the society and knew of its discouragements. But at the crucial time the spirit of co-operation among our citizens having manifested itself and the gift of a Shelter, inaugurated a new ear. It was a work that should appeal to all, as it was second to none in the philanthropic field.

Principal Colling, in seconding the motion, said that the thought of self protection should move us to care for neglected children, as they were the material out of which criminals were made.

The motion for the reception and adoption of the report carried.

The Officers of the Society are:—

President—Thos. Ritchie.

Secretary—C. B. Scantlebury.

Agent—W. H. Wrightmeyer.

BERLIN.

The annual meeting of this Society was held in the Library, Dec. 6th. The treasurer, Mrs. Lackner, presented her annual report, which showed a gratifying cash balance in the bank. In view of the fact that the production, "The Toys Awake," netted a snug sum, the Society decided not to call on the public for a special collection next year, as has been the custom. The Society feels grateful to the public for their generosity in the past.

The annual meeting of the Children's Aid Society of Waterloo County was held in the Public Library on Friday afternoon, at which Mr. J. J. Kelso, the Provincial Superintendent, was present and delivered an address on Children's Aid work.

President Boese presided. The representation from the County was very gratifying, the following members being present:—Berlin, Rev. W. A. Bradley, Secretary; Rev. T. Spetz, Mr. Strickland, Rev. C. R. Miller and Mrs. J. Kaufman; Galt, Mrs. Dalzell; Waterloo, Mrs. C. Snyder, Mrs. Geo. Wegenast; Wellesley, Mr. C. T. Ottman; Elmira, Rev. P. Graupner; New Hamburg, Mr. John Wing. Miss Snider, the matron of the Berlin Orphanage and Mr. J. Wiegand were also present.

On motion the old officers were sustained with the addition of Mr. J. Strickland and Mr. David Pannabecker, of Hespeler.

On the Way to Foster Homes.

Inspector Miller's Report.

Rev. C. R. Miller submitted the following report of his work during the year. After hearing it, the members expressed their heartfelt thanks for his excellent work and untiring efforts in the Children's Aid work. A committee, comprised of the President, Rev. T. Spetz and Mrs. Kaufman was appointed to ascertain whether some substantial remuneration could be made Mr. Miller for his splendid work.

The number of special investigations made by Mr. Miller during the year was 165; forty-seven children were made wards of the Society, and the number of children placed in foster-homes, replaced, reapprenticed or returned to parents was 204; three boys were sent to Industrial Schools and three wards died. Mr. Miller also attended thirty-three meetings and visited schools and addressed children upon eleven occasions. He also visited 121 children in their foster-homes, organized six new Societies and wrote 1,563 letters. The number of applications for children received was 190, fifty-nine of these being for boys and 131 for girls.

The Officers are:—
President—W. C. Boese.
First Vice-President—Mr. A. S. Hallman.
Second Vice-President—Rev. A. J. Fisher.
Treasurer—Mrs. H. G. Lackner.
Honorary Solicitors—Messrs. E. W. Clement and W. M. Cram.
Secretary and Inspector—Rev. C. R. Miller.
Assistant Secretary—Miss Kirk.

BRANTFORD.

The seventeenth annual meeting of the Brantford Children's Aid Society was held in the Y.M.C.A. parlors. There was an excellent attendance in spite of the disagreeable weather. It was announced by Mr. T. H. Preston that the advisability of erecting a new building for the proposed Thomson Memorial had been agreed upon by all parties and that it was expected the little difficulty relevant to the site for the building would be setled at an early date and work proceeded with this summer. The announcement was received enthusiastically. Short addresses were made by Messrs. Henry Yeigh, Chief S. Slemin, and the new president, Mr. Geo. Kippax.

Mr. J. L. Axford's statistical and general report was received with a great deal of interest and gave among other interesting items the following: 203 complaints received; 325 children involved; 82 applications received; 26 aplications filed; 6 children placed for other societies; 10 children returned to the society and replaced; 2 children placed in the Orillia Idiot Asylum; one placed in King Edward sanitarium; 1 placed in Sick Children's hospital; 90 wards visited or heard from; 18 children made wards of the Society; four children returned to the parents; 2 children returned to the Industrial school; 3 children returned from the Industrial school; 13 offered for adoption; 29 offered as boarders; 111 boys at juvenile court; 5 girls at juvenile court; 3 men were sent to Central Prison for serious crimes against children; 2 court convictions for indecency towards children; several warnings and some prosecutions for supplying children with liquor or tobacco.

Many homes have been bettered, the work of the Society better understood and the people are realizing that children have rights that must be considered.

The generous gift of Mrs. Peter Wood of $6,000 for an S. M. Thomson Home for Children fills a long-felt want and a cherished hope of Mr. Thomson during his last years.

Another instance of helpfulness is a case where a child had been taken to the Shelter temporarily as the mother was unable to provide for her; she was secured a position and she was again able to care for her child. She visited the Shelter recently and asked what was needed for the children. She returned in a few days with a goodly bundle of well-made new clothes and also gave $2 to help get anything else needed.

The City Council again gave us a grant of $500, the County Council $100 and the Brantford Township Council $25, for which we are grateful.

Magistrates Livingston, of Brantford, and Patterson, of Paris, have at all times given cheerfully advice or assistance in carrying out of the Children's Protection Act of Ontario

There were 38 children cared for in the Shelter during the year with a total stay of 2,545 days. Average stay of each child was 67 days.

Officers.

Hon. President—Rev. Dr. Mackenzie.
President—George Kippax.
Vice-Presidents—W. B. Wood and E. L. Cockshutt.
Corresponding Secretary—J. Leslie Axford.
Recording Secretary—Miss Sarah Brown.
Treasurer—C. Cook.
Honorary Solicitors—Harley, Sweet & Brewster, Muirhead and Heyd.

Executive Committee—All resident clergy; Glad. Whittaker, Dr. U. M. Stanley, Dr. William Nichol, John T. Ham, T. H. Preston, A. L. Vanstone, R. W. Robertson, T. L. Wood, Frank Cockshutt, Chief C. Slemin, A. L. Baird, John Mann, Andrew McFarland, Frank Foster, J. C. Coles, Dr. Burt, Richard Sanderson, John Douglas, Henry Yeigh; Mesdames F. Munro, G. F. Miles, A. Watts, G. Wheeland, G. S. Winter, John Kerr, Andrew Bowers, J. M. Shuttleworth, Peter Wood, John Jefferson, Miss E. B. Witty.

PARIS.

As the result of a visit from Mr. Kelso, accompanied by Mr. J. L. Axford, agent for the county, it was decided to re-organize the Children's Aid branch at Paris.

The following have been appointed as a Committee:—Mr. L. Maus, secretary, Dr. Burt, Miss Malcolm, Alex. Davidson, J. H. Fisher, M.L.A., Alex. Kirkpatrick, Chief Felker, John Brockbank, Mr. Dewey (principal of school), Jas. Smiley, William McLaughlin, Arthur Sayles, G. W. Featherston, Mrs. John Jefferson, Mrs. Thos. O'Neil, Miss K. Thomas, Miss Florence Taylor.

BURK'S FALLS

As the special representative of the Provincial Superintendent, Rev. C. S. Pedley, Inspector for Woodstock and Oxford County, visited Burk's Falls and other northern points. He addressed the annual meeting of the Society here on the 26th of November, also visited the School and made a number of calls in the interests of the Society's wards and other children. He attended the police court, and afterwards went on to North Bay.

The meeting of the Society was attended by representative citizens. The Society appeals to the clergy of all denominations throughout the district and all Christian workers to study the Children's Aid movement and make its purpose known.

Mr. Pedley congratulated the citizens of Burk's Falls on the excellence of their public school. Under the management of the cultured Principal, Mrs. Burchill, and her able staff, the school presents an appearance of cheerful order and industry which augers well for the future of the boys and girls who have the good fortune to enjoy the opportunities it offers.

And it would be a great thing for this northern country, with its scattered population and its isolated farms, where the struggle to win a livelihood out of the not too friendly soil leaves scant energy for attending to the higher interests of life, if towns like this would join their forces in a crusade to help the less fortunate homes, set far apart, ill-equipped for effective co-operation, and not consider the goal won until every child in the district has access to a good school and the parents are plied with incentives to take advantage of them, so that all the children may have an equal chance with the fortunate children of Burk's Falls.

The following Officers of Burk's Falls Children's Aid Society were duly elected:—

President—Walter Sharpe.

Vice-Presidents—Resident Ministers, including Rev. Father Fleming of Kearney.

Secretary—Miss A. L. Prior.

Treasurer—Mrs. Geo. Silvester.

Council—J. N. Dodds, Mrs. Ed. Adams, Miss West, C. W. Sharpe, Jos. Hilliar, Mrs. Tasker, J. P. Waters, Mrs. Vincent Russill, Mrs. Burchill, Walter Sharpe.

BROCKVILLE.

The annual meeting of the Brockville Branch of the Children's Aid Society was held in the Town Council Chamber for the presentation of the official reports, election of officers, transaction of general business, and to hear an address by Mr. Kelso.

President W. H. Osborne occupied the chair, and among those present were the Revs. O. G. Dobbs, F. D. Wodcock, H. H. B. Jones, W. H. Sparling, C. Baynes Reed, A. J. Traill, D. M. Spaidal, H. A. Stewart, K.C., W. A. Lewis, W. A. Gilmour, Dr. W. F. Jackson, Mrs. Traill, Miss Ross, Miss Annie Hutcheson and Judge McDonald.

The meeting was opened by a short prayer from Rev. Dr. Sparling, after which the report of the Agent, Mr. Traill, was read.

To the President, Members and friends of the Children's Aid Society:

The future of this great movement for the betterment of children looks exceedingly bright.

During the past twelve months 59 cases have been brought before the Society, and in most cases very satisfactorily dealt with. Nine children were made wards of the Society—seven girls and two boys, ranging from 1 to 14 years of age.

Three of these were abandoned by their mother and stepfather—they were found in the evening, between 7 and 8 o'clock, wandering in the Township of Augusta, without food or shelter.

Two were taken from parents on account of gross neglect and immoral influences.

One was placed in the Shelter on account of the father being too indolent to provide for the mother and child.

Three were found between the hours of 8 and 9 o'clock in the evening without any home or shelter, having been brought here from Dundas County by a man and a woman, the man having deserted them. The children were poorly clothed and had not tasted food since early morning. The eldest child, a girl of 11 years, was so deficient in mind and morals that after three months' treatment in the Shelter it was found necessary to place her in the Orillia Asylum. The other children have all been adopted, and to-night they are in happy Christian homes, where they have every opportunity to develop into good and useful lives. Where, and under what influences and conditions, would these children be to-night if there were no Children's Aid Society?

A number of cases of truancies and neglect on the part of parents to send their children to school were reported. Visits were made, and in most cases the fault was found on the part of the parents, who keep their children home on the slightest pretext.

At the request of Mr. Kelso, the Provincial Superintendent, I visited 49 children, formerly rescued by this Society and placed in foster-homes, in the Counties of Leeds and Grenville. It was a great source of pleasure and satisfaction to meet these children in their new homes. To look back on their past and now see them in their comfortable surroundings. To observe how they are growing and developing under Christian training, was most gratifying indeed.

The Society and your Agent are deeply indebted to His Houour Judge McDonald, and to our solicitor, Mr. H. A. Stewart, K.C., whose counsel and help are at all times freely given.

Dr. Jackson has also been most faithful in his attendance when called upon. The Agent is deeply indebted to the Chief of Police and the staff for their kind assistance whenever called upon, and to the press for free advertising from time to time.

We are deeply grateful for the continued confidence and generous grant from our Town Council, and for the keen interest, sympathy and generous gifts of Mrs. A. C. Hardy, Mrs. W. H. Comstock and other kind and thoughtful friends.

I cannot close without reminding you that a great deal is being left undone. Many cases have been left to go by default for lack of time and better equipment. I sincerely trust that ways and means will be provided for all the needs of the coming year.

All of which is respectfully submitted.

A. J. Traill, *Agent.*

Treasurer's Report.

Following the Agent's report, which was an excellent one, the report of the Treasurer, Mr. C. E. Baynes Reed, was presented as follows, which leaves a fairly good balance on hand with which to carry on the worthy work:—

Receipts—Brockville grant, balance 1909, $50.00; Brockville grant, 1910, $250.00; Gananoque grant, $20.00; Augusta, $15.00; Donations, $46.11; Recovered from parents and municipalities, $224.20; Interest, $16.67; Total, $621.98.

Payments—Maintenance of Shelter, $160.60; Board of Children, $245.48; Travelling expenses, $40.05; Clothes, medicine and sundries, $63.85; Total, $509.98.

OFFICERS ELECTED.

Upon motion of Judge McDonald, seconded by Rev. Mr. Dobbs, the old officers were re-elected as follows:—

President—W. H. Osborne.

Vice-President—Mrs. W. H. Comstock.

Treasurer—C. E. Baynes Reed.

Secretary and Agent—A. J. Traill.

Advisory Board—Messrs. Osborne, Spaidal, Wright, Stewart, Traill, Wilgress, Reed.

Auditors—G. A. Wright, A. T. Wilgress.

Physician—Dr. W. F. Jackson.

Solicitor—H. A. Stewart, K.C.

Supervisory Board—Mrs. A. C. Hardy, Mrs. W. H. Comstock, Mrs. Giles, Mrs. Connell, Mrs. M. Dowsley, Miss McGannon, Miss Jane Smart, Mrs. Findlay.

At its January session, the County Council made a grant of $200 to the Society.

COBOURG.

Greater interest has been aroused in the work of the C. A. S. by means of public meetings, which were well attended, both by ministers and the general public.

Rev. C. R. Miller, the agent for Waterloo County, was present at a large gathering in the King George Theatre, which was generously placed at his disposal by Messrs. Perks & Mitchell. Rev. Wm. Beattie occupied the Chair and most of the ministers of the town had seats on the platform. Rev. Mr. Rolph opened with prayer, Rev. Mr. Beattie and Rev. Dr. Shorey gave short addresses, emphasizing the wisdom and economy of saving wayward and neglected children rather than allow them to drift into crime and pauperism and become a public charge. Rev. Mr. Miller described the work of Children's Aid Societies and explained the Children's Protection Act of Ontario, giving a number of touching stories of children who had been saved as useful members of society. In response to his request a number of those present promised subscriptions for support of the work.

During the meeting the serious danger attending young boys and girls roaming the streets to late hours of night was referred to, and also attention was drawn to the growth of immodest conduct of the same upon the streets; it was then decided that some steps should be taken to stop the evil, and Rev. A. F. Pollock moved, seconded by Mr. Thompson, "That this meeting request the Town Council to pass a by-law forbidding young boys and girls to be about the streets late at night, and, that the police be empowered after a certain hour to order them home."

The motion was carried by a standing vote.

Officers of the Society are:—

President—Mr. J. Burchill.

Vice-Presidents—Mrs. H. T. Holland and Mrs. J. T. Field.

Secretary-Treasurer—Mr. J. W. Bickle.

Hon. Solicitor—Mr. H. F. Holland.

Agent—Mr. J. C. Ruse.

At the Orphanage.

On the Lake Front, Toronto.

CHATHAM.

At the annual meeting of the Children's Aid Society of Chatham and Kent County a successful year's work was reported. The Secretary's statement was as follows:—

Mr President, Ladies and Gentlemen:

I beg to submit my annual report as Secretary of the Kent Children's Aid Society for the year 1910. Our board was made up of fourteen ladies and twelve gentlemen. The number of meetings held during the year was ten, with an average attendance of eleven members; the President, Executive Officer, Secretary and one lady attended every meeting of the board. The work put upon the individual members of the board is very light. They are expected to attend the monthly meetings, to assist in soliciting membership, to act when requested in investigating cases, apart from the Executive Officer; requiring rather a woman's gentleness than a man's act. I may say that some of the present board have been very kind in taking hold of several cases and supplying the needed remedy for the conditions which they found, and they have expressed themselves as surprised that such conditions could exist, but were grateful for the opportunity offered of bettering them. Our Executive Officer, Mr. W. R. Baxter, has been very diligent during 1910, and has handled the cases coming under his notice with kindness, coupled with authority; ever having before him the welfare of the child. Our President, has been, as usual, ever ready to do his share—yea more than his share of the work, and to him is due in a large measure the success of the society for the year. In conclusion, I hope that the board of 1911 will realize their responsibilities and that the year will be filled with good deeds done, and kindness shown to the neglected, dependent and orphaned child.

Respectfully, R. V. Bray, M.D., *Secretary.*

The financial report showed a balance of $13.49 which, although the lowest for some years, is accounted for by the heavy expenditure which it was found necessary to make at the end of the year.

A very interesting programme was rendered during the evening. The musical selections, several in number, were all worthy of hearty applause, which they received. Addresses by Rev. J. C. McFarlane, Rev. Dr. Daniels and Rev. E. F. Armstrong proved most instructive, and embodied many interesting facts.

A gratifying statement made by Mr. Paterson was that little difficulty is experienced in getting the children homes, as frequently applications come in from town and country which it is impossible to fill.

The list of officers is as follows:

President—D. S. Patterson.
Secretary—Dr. R. V. Bray.
Treasurer—Mr. Fred Stone (now Judge at Sault Ste. Marie).
Executive Officer—W. R. Baxter.

HAMILTON.

The annual meeting of the Hamilton Children's Aid Society was held in the hall of the Y. M. C. A. There were several prominent clergymen present and a number of ladies who are interested in the good work. The first matter taken up was the directors' report, which was read by Adam Brown, who presided.

The directors' report was as follows:—

"During the year there have been eight regular business meetings. There have been 30 complaints during the year of children being neglected and ill-treated.

"Thirteen girls and eight boys were placed in foster-homes during the year. Three girls were removed from homes in which they had been placed, in consequence of the

agreements not being carried out. In the cases of two girls, where foster-parents were not satisfied with them for one reason or another, they were removed, but have been placed in other good homes.

"Three girls in the care of the Society have reached eighteen years of age; one of them has been married. One girl, aged seventeen, has died during the year.

"Two boys ran away from their homes, but were subsequently found and taken back and are doing well.

"During the year the Society has had 197 applications for boys and girls of about fourteen years of age. Of course your Society was unable to supply them, and each case was dealt with as the circumstances called for.

"There were five girls and one boy transferred to the guardianship of the Society during the year.

"Seven children were handed over to the custody of the Society by order of the Police Magistrate.

Inspector Pinch, Hamilton,
Taking Children to Foster Homes.

"His Worship the Mayor and the Chairman of Finance, Ald. Main, both realize the necessity for a shelter, and a sub-committee has been appointed to consider the question and discuss it with this Society. As yet, the Society has had no intimation of their meeting. Until we get a shelter, so that we can take care of incorrigible children until we find them homes, the magistrate can do nothing else than send them to the reformatory, and the city has to pay.

"The Society took charge of quite a number of boys during the year that had no homes or anyone at all to look after them, and had no trouble at all in finding good homes for them. These were boys found by the police, and were not Hamilton boys.

"Six incorrigible girls, about fourteen years of age, whom their parents seemed to be unable to do anything with, and had lost control of them, and who were going astray, were taken in charge by the Society. Four of them were placed in homes, and

two of them had to be sent to the reformatory. Had it not been for the loving services of those connected with the Home of the Friendless every one of these girls would have been sent to the reformatory.

"There have been, as usual, complaints of small children carrying liquor from saloons for their parents. Happily, there will be no more of this. The frequent reference of the press in this city and strong pressure of the Society to put a stop to this practice has been productive of splendid results, and the Government is to be highly commended for the prompt action in so changing the law to prevent what has hitherto been the cause of so much evil-doing. In reviewing the number of cases during the year, the condition of degradation in which the Society found children is traceable almost in every case to drink.

The election of officers resulted as follows:—

President—Adam Brown.
Vice-Presidents—Lt.-Col. Moore, W. H. Wardrope, K.C., and W. A. Robinson.
Treasurer—J. M. Burns.
Secretary—Miss Forbes.
Inspector—J. C. Pinch.
Executive—Hon. J. M. Gibson, Geo. Rutherford, Lt.-Col. Moore, J. J. Greene, W. H. Wardrope, Mesdames J. M. Gibson, Evans, Lucas, Kilgour, Barker, Beasley, Levy, Wingate, Zimmerman, Urquhart, D. B. Pratt, and Malloch; Miss Lawson, Miss Duff.

Supplementary Report.

The Secretary sends the following report of work accomplished since the meeting in June:—

Complaints investigated, 60, affecting over 200 children; children handed over to C. A. Society, 22; girls placed in foster-homes, 19; boys placed in foster-homes, 4; two girls were sent to Mountain Sanitarium for treatment; one girl sent to the reformatory; three boys sent to the Industrial Schools.

A bazaar was held at "Gateside House," the residence of Mrs. Wm. Hendrie, for the benefit of the Children's Aid Society. It was an unqualified success, both as a means of awakening interest in the work and financially. The sum of $683 was realized, to be used in equipping the Shelter.

A by-law, providing the expenditure of $7,500 for a Shelter was passed, and before the year is out we expect to have a building furnished ready for our wards.

A Clothing Committee was appointed in September and has proved a great boon in outfitting wards for foster-homes. Through wise and tasteful buying, the children recently placed out have been splendidly equipped at a nominal cost.

Ex-Sergeant Pinch has been appointed Agent of the Society.

DRESDEN.

The Society here has done and is doing good work. It is well patronized and is supported by over fifty members. All deserving children have been helped, and at present there are no children in want. The members are alive to their responsibilities and interest is shown in all deserving cases.

Officers elected:—
President—Mr. G. E. Weir.
Vice-President—Mrs. I. B. Webster.
Treasurer—Mrs. F. Laird.
Executive Committee—Mesdames McVean, Williams, Lindsay, Webster and Laird.
Secretary—Mrs. Charles Aikin.

EXETER.

The annual meeting of the Exeter Children's Aid and Humane Society met November 22nd. The officers of last year were re-appointed, viz.:—

President—Wm. B. Weidenhammer, B.A.
First Vice-President—Mr. F. W. Gladman.
Second Vice-President—Miss H. Kinsman.
Secretary—Mrs. J. M. Fitton.
Treasurer—Mr. G. Harrison.
Executive—Mrs. M. Fowell, Mrs. Heman, Mrs. J. A. Stewart, Miss K. McFall, Mr. D. Cobbledick.

GUELPH.

The annual meeting of the Humane and Children's Aid Society of Wellington County was held in Carnegie Hall. The attendance was not as large as some other annual meetings, but it was thoroughly representative, and a great deal of interest was manifested.

The President, Sheriff Allan, occupied the chair, and after Rev. J. J. Clemens had offered prayer and Prof. and Miss Kelly had rendered a charming guitar and mandolin duet, he reviewed briefly the work of the society for the past year. He thanked those who had assisted in any way in the work, and gave a great deal of the credit for the successful year they had had to Inspector Tovell. That gentleman had been a hard-working and zealous officer, and looked carefully after the interests of the Society.

The Inspector reported that during the past twelve months ninety-five cases have received the attention of the Guelph Society. About seventy homes have been visited and one hundred and ninety-seven children have been found in these homes. Some of these cases needed but one visit, while others have been under the Society's care for months. Of these sixty-two cases were in the city, twenty-five in Wellington County, and eight were outside cases.

From these, fifteen became wards of the Society. Thirteen were committed by the magistrate and two were transferred by their parents. Nine were girls and six were boys.

In all, thirty-one children have been in the Shelter during the year.

Twenty-one children were placed in homes and two of these were placed a second time.

Three were taken to the Industrial Schools.

The wards visited are, with rare exceptions, doing well under favorable circumstances. Some are infants, others young men, and one young mother was visited in her own village home.

The Shelter is a very important part of the Society's equipment. It provides a temporary home for the children who are committed to the Society, and also occasionally to other unfortunate little ones. The Matron, who at once takes the place of mother to the children, is constant in her care of the children, and bestows much affection upon them. Mrs. Allen is worthy of much praise in doing her work so well.

The report of the Nominating Committee was submitted as follows:—

Hon. President—Lt.-Col. N. Higinbotham.
President—Sheriff A. S. Allan.
First Vice-President—Mrs. T. Goldie.
Second Vice-President—Rev. C. H. Buckland.
Secretary—Miss Melvin.
Treasurer—Mr. T. R. McMaster.
Solicitor—Mr. W. E. Buckingham.
Inspector—Rev. Amos Tovell.
Physicians—Dr. F. Walsh and Dr. H. C. McLean.
Veterinary Surgeons—Dr. G. Harvey and Dr. W. Davidson.
Auditor—Mr. Geo. Chapman.

Country School in Ontario.

Men in the Making.

Members of Executive Committee—The Mayor, Mrs. J. C. Chadwick, Mrs. Foster, Mrs. J. C. Smith, Mrs. Wm. McDonald, Mrs. H. C. Scholfield, Mrs. J. I. McIntosh, Mrs. D. Allen, Mrs. J. Anderson, Mrs. C. W. Dawson, Mrs. Wells, Mrs. K. McLean, Mrs. H. Gummer, Miss Masters, Miss Robertson, Miss Forbes, Miss M. Howitt, Miss Guthrie, Miss M. E. Thompson, Miss E. Hartley, all the city pastors, Dr. Brock, Mr. D. Young, Mr. W. H. Hamilton, Maj. Merewether, Dr. Grenside.

A recent letter from the Secretary of the Society conveys the pleasing information that the late Mrs. H. Cormie left $500 toward the new Children's Shelter fund, and that $1,500 had been collected by special effort.

The County Council grant to the Society has been increased to $500.

GANANOQUE.

The Humane and Children's Aid Society held its annual meeting on Friday, November 11th, in the Assembly Hall of the High School. The President, Rev. J. T. Pitcher, occupied the chair, the hall being well filled.

Mr. J. J. Kelso gave an illustrated lecture on the work, which everyone enjoyed, and he and Mr. Pitcher and Mr. Carroll addressed the children. The Secretary read the annual report, showing that the Society had held three meetings during the year, distributed considerable literature, and had considered a number of careless families representing a considerable number of children, with a view to taking early action for their rescue from a future of ignorance and vice. The following officers were elected for 1911:—

Hon. President—Charles Macdonald.

President—Rev. J. T. Pitcher.

Hon. Vice-President—Geo. Taylor.

Vice-Presidents—Miss Edith McCammon and Russell H. Britton.

Secretary-Treasurer—Mrs. W. S. Bowden.

Hon. Solicitor—J. A. Jackson.

Executive Committee for Children's Aid—The clergymen of the town, the public school teachers, Mr. J. A. Jackson, Mr. E. O. Webster, Mrs. B. O. Britton, Mrs. J. A. Bulloch, Mrs. Bowden, Miss McCammon, Miss Colton, Miss Locke.

HUNTSVILLE.

At the last annual meeting of the Huntsville Branch of the Children's Aid Society, the following committee was appointed representative of the town: Mrs. Turnbull, Mrs. Bazett, Mrs. Hart, Mrs. Highstead, Mrs. Whiteside, B. P. Clarke, H. E. Rice, Mr. Howell, Chief Watson and the ministers of the town.

At the first meeting of the Committee the Rev. C. W. Balfour was elected Chairman and Mrs. Jno. Whiteside Secretary-Treasurer. Chief Watson is Agent, and Mr. A. Howell Honorary Solicitor.

During the year six meetings of the Committee have been held.

A brother and sister have been removed from a deplorable home and sent to the Children's Refuge in Toronto. Several cases needing attention have been closely investigated and warning given by our Agent when required. Altogether the year's work is regarded as fruitful of good results and many families are undoubtedly the better and happier for the oversight and interest of the members of this Branch.

HALDIMAND COUNTY.

A very encouraging work has been started in Haldimand County by the successful formation of a County Children's Aid Society at Cayuga, the county seat.

Inspector W. A. Gunton, accompanied by Mr. D. E. McIntosh, Agent for Simcoe, met sixteen business men and all the clergy of the town in the Council Chamber, and

the meeting resulted in arrangements being made for an earnest effort to deal with neglected children. A President and Vice-President were elected and a Financial Committee appointed to present the claims of the work in the neighbourhood and solicit support. The pleasing announcement was made shortly after that the Council had made a grant of $100 in aid of the work.

Mr. D. E. McIntosh, of Simcoe, was also appointed Agent for the County.

After the meeting, work was immediately taken up, Mr. McIntosh having two cases to investigate and arrangements to make for boarding wards of the Society.

The first monthly meeting has since been held successfully and the Agent's report submitted.

Following are the officers elected:—

Hon. President—Dr. Baxter, Registrar of Haldimand.
President—Rev. F. C. Walling, Anglican Clergyman.
Vice-President—Sheriff McConnell.
Treasurer—W. J. Quinsy.
Secretary—J. W. Sheppard.
Finance Committee—Sheriff McConnell, A. Mitchell and A. McBride.
Agent—D. E. McIntosh, Simcoe, Ont.

INGERSOLL.

Following is the report of the Secretary, Mr. J. F. Morrey, to the officers and members of the Ingersoll Branch of the Children's Aid Society:—

Another year has passed into history leaving behind it memories pleasant and unpleasant.

It has been a pleasure to go into some homes where assistance could be lent for the betterment of the little ones who come within our care, but it has been with sorrow that I have been compelled to go to other homes and with the aid of the law take from the family children who had gotten beyond control.

On March 28th last, it was necessary that one lad of eleven be brought before the magistrate, charged with the theft of a purse. The boy was allowed out on suspended sentence.

On August 12th, another boy of nine was tried for stealing a horse, and as he had been up on previous occasions the magistrate committed him to the Industrial School for a term of four years.

In January, a boy of fifteen was before the magistrate charged with burglary, and was committed for trial before the judge.

Many homes have been visited personally and I have reason to believe that much good has been accomplished by these visitations.

During the year the only receipts were from the County Council, from whom we received a grant of twenty dollars ($20.00), which was placed in the hands of the Treasurer.

Orders for the following amounts being authorized, were drawn on the Treasurer: No. 11, B. Gray, $1.00; No. 12, expense of child, $2.00; No. 13, postage, 50 cents; No. 14, clothing for child, $3.00; No. 15, expense of child, $2.25; No. 16, expense of child, $1.45; No. 17, expense of child, 75 cents; a total of $10.95.

I desire at this time to express my appreciation of the uniform courtesy and the untiring assistance rendered by the Chief of Police, also for the kindly and efficient work of each of the officers of the Society.

Officers elected:—

President—T. R. Mayberry, M.P.P.
Vice-President—H. E. Robinson.
Secretary—J. F. Morrey.
Treasurer—R. J. Robertson.
Solicitor—J. G. Gibson.

LISTOWEL.

A successful Children's Aid meeting was held in the Public Library building. There was a good attendance and active interest was manifested. The President of the Society, Rev. D. W. S. Urquhart, gave an address in the interests of children. Rev. Hugh Ferguson, the county Agent, also spoke of the work accomplished, and questions bearing directly upon the protection of children were ably discussed by Mayor Hay, Mr. T. L. Hamilton, Mr. James Boyd, Mr. Roderick Ross, and others.

Twenty-five cases of neglected children had been dealt with in the district during a period of 8 months, all of whom were well cared for by the Perth County Society.

Action was taken against a local tobacconist for supplying a boy with cigarettes. A fine was imposed by the magistrate and an understanding entered into by the vendor not to sell again to boys under the age stipulated by law.

The officers of the Society are:—

President—Rev. D. W. S. Urquhart, B.A.

Vice-Presidents—Mrs. Purcell, Mrs. Foerch, Rev. W. F. Price.

Secretary—Mrs. T. L. Hamilton.

Treasurer—Mrs. J. J. Foster.

Committee—James Tremain, D. S. Weber, Andrew Foerch, F. W. Hay, Mrs. Price, Mrs. W. Dougan, and Mrs. (Dr.) Large.

LINDSAY.

The annual meeting of the Children's Aid Society of Victoria County was held in the City Council Room, Mr. John Rogers occupying the chair in the absence of the president, Dr. White.

A lengthy discussion followed on the question of building a children's shelter, as the Society found it difficult to take neglected and homeless children when there was no place to put them. Here is an opportunity for some wealthy friend of the town to give substantial help!

During the year the Society received as wards three children. Three children have been placed in foster homes, two being placed in Victoria County and one in Durham County. A boy placed in a home near Glenarm a few years ago was returned to the Society and was again replaced.

Financially the Society has been aided by a grant of $125 from the County Council and $25 from the Municipal Council of the town of Lindsay. Contributions of second-hand clothing have been thankfully received and articles of clothing have been given at various times to needy families in town. We wish to make special mention of parcels received from Mrs. Burke, of Reaboro, who regards it as an annual obligation and great privilege to make several kinds of comfortable garments for needy little children.

Two children, wards of our Society, have received timely treatment in the Ross Memorial Hospital during the year, for which your Board of Managers are sincerely thankful. Before closing we beg to call the attention of this meeting to the question of taking steps towards securing for this county a children's shelter.

Officers re-elected:

Hon. President—S. J. Fox, M.P.P.

President—Dr. White.

First Vice-President—John Rogers.

Second Vice-President—G. Rea.

Third Vice-President—W. H. Stevens.

Fourth Vice-President—G. H. Wilson.

Fifth Vice-President—G. E. Broderick.

Secretary—(Mrs.) E. E. Sharpe.

Treasurer—(Mrs.) G. A. Milne.

Council—Mrs. McCrae, Mrs. Robinson, Mrs. Weldon, Mrs. Cairns, Miss Twamley, Mrs. Mitchell, Mrs. Gough, Mrs. Spratt, Miss Hannahoe, Mrs. Rustad, and Mrs. Wilkinson; Mayor Beal and Messrs. H. Dobson, Dr. Vrooman, Jas. Gillogly, R. Kylie, Rev. D. Balfour, E. E. W. McGaffey, Pool (Adjutant of Salvation Army), Rev. Canon Marsh, A. Horn, R. C. Vincent.

Mr. O'Connor and L. R. Knight were elected solicitors for the Society, and Messrs. Smale and Campbell, auditors.

KINGSTON.

The annual meeting of the Kingston Children's Aid Society was held in the Police Court Room, at the City Hall. In the absence of Mayor Couper, who could not attend, the meeting was presided over by Alderman John McKay. After the business part of the meeting had been concluded the members had the pleasure of listening to an address delivered by George P. Bryce, B.A., of Toronto, who spoke on the subject, "Problems of the City."

The President, Rev. A. Laird, gave a report, in which he paid tribute to the good work carried on by the Agent, Rev. D. Macallum, and Constable Samuel Arniel, who had been enrolled as a member of the Society.

Rev. Mr. Fairlie reported for the Agent, Rev. Mr. Macallum. During the year, thirty or forty calls had been received and responded to. The Society had now fifty-four wards. A warm tribute was paid the president, Rev. A. Laird, for the good service he had rendered. It was pointed out that one of the greatest needs of the Society was that of a shelter home, where children could be kept until suitable homes could be secured for them.

This concluded the business, and Mr. Bryce was then called upon, and he spoke for about forty minutes upon some matters of vital interest to the members of the Society. He had come, he said, to represent Mr. Kelso, who was deeply interested in the enlargement of the Society's work. He spoke of the modern city and the congested population. He referred particularly to room overcrowding, which did away with home life for the children, pointing out the many drawbacks for children with these surroundings. All this, he pointed out, was not a matter of choice, but of necessity. People lived in these crowded places because they were forced to do so. In big cities men had to live near their work, as they could not stand the expense of car fare.

Since the annual meeting the Society has appointed Mr. J. C. MacConochie, M.A., as inspector, and he has now entered upon his new duties with every promise of successful work.

The officers are:

President—Rev. A. Laird.

Vice-Presidents—Rev. D. Laing, Canon Cooke and Rev. W. F. Fitzgerald.

Secretary and Agent—J. C. McConachie, M.A.

Treasurer—Prof. W. S. Dyde.

Solicitor—G. M. Macdonnell, K.C.

Committee—Canon Starr, Rev. William Craig, Rev. H. D. Whitmore, Miss Machar, Miss Muckleston, Miss Ronan and Mrs. Macallum.

NORWICH.

At the annual meeting of the Children's Aid branch at Norwich the following officers were elected:

President—J. C. Shaw.

Vice-President—H. Webster.

Secretary-Treasurer—J. H. Entwhistle.

Agent—W. Fairly.

Executive Committee—Dr. J. H. Fram, J. A. Teo, F. Lees, Mrs. H. Van, Mrs. E. W. Bouyer, Mrs. W. R. Brown, and resident Ministers.

NIAGARA FALLS.

The Niagara Falls Humane and Children's Aid Society held a largely attended annual meeting in the Sabbath School Rooms of St. Andrew's Church. Mr. Charles Black presided and First Vice-President John Logan acted as secretary. The meeting was largely attended by representative people.

The programme opened with a prayer by Rev. David A. Moir.

A. Monro Grier, K.C., in an eloquent address, commented on the work of the Society. He emphasized the fact that despite creed, any organization doing work in behalf of humanity won general support from all thinking people. Mr. Grier took occasion in this connection to publicly thank those who have given to the Nurses' Home fund.

Mr. Black then read his report, which showed that the Society was in flourishing condition. The distinctive aim of the Society is not to pounce upon a boy or girl for their first, or even second offence, but to go to their homes, and seek to improve the conditions of the child's surroundings, by encouraging, or if need be, threatening that a change is absolutely necessary for the well-being of their children. We gratefully acknowledge substantial cheques from the City Council, also the Stamford Council; for legal advice from Mr. D. B. White, our honorary counsel; also for assistance of Dr. Watson; not overlooking the valuable co-operation of the press of our city and of Mr. John Logan, one of our Vice-Presidents, and all those who kindly help us in bearing the burden.

Work accomplished: Investigated children's cases, and families visited, 94; children sent to Industrial Schools, 8; children placed in families, 12; visits for Mr. Kelso in Counties of Welland and Haldimand, 71.

The following is the list of officers:

President and Inspector—Mr. Chas. Black.

First Vice-President—Mr. John Logan.

Second Vice-President—Mr. James Morden.

Secretary—Miss M. E. Smith.

Treasurer—Mr. J. G. Cadham.

Hon. Solicitor—Mr. D. B. White.

Hon. Veterinary Surgeon—Dr. Watson.

Executive Officers—Officers and Messrs. J. H. Stuart James Mowat, W. H. Arison, J. D. Dickson, Wm. Edwards, H. J. Wamhold, F. H. Leslie, W. G. Ward, Dr. Robb, A. Monro Grier, K.C.; Dr. Wilson, John Muir, Dr. Musgrove, J. E. P. Rothwell, Alexander Pierson, and Thomas Berriman, also the clergymen of the city; Mesdames J. H. Stuart, Norman Walker, George Hanan, Frank Taylor, George Payne, Abel Land, F. J. Gribble, David Waltho, F. Anderson, H. R. Elliott, and James Barry, Misses M. A. Henderson, Annie Butters, M. A. Black, Miss Bush, and Miss E. L. Lundy.

NAPANEE.

The Children's Aid branch at Napanee still continues to help in the good work of child protection, and several children were removed from most immoral surroundings during the year. Mr. Kelso, accompanied by Messrs. C. B. Scantlebury and W. H. Wrightmyer, of Belleville, attended and took part in the annual gathering in November, and great interest was shown by those present. One of the speakers at the meeting, Rev. F. Dibb, met with a fatal railway accident, not long after, to the great sorrow of many friends.

The officers are as follows:

President—Mr. F. Burrows.

First Vice-President—Mrs. McGurn.

Second Vice-President—Mrs. C. H. Edwards.

Secretary—Mrs. F. L. Hooper.

Treasurer—Mrs. W. A. Grange.

English Church Representatives—Rev. F. Dibb, Mr. D. Hill, Mrs. E. Wilson, Mrs. R. G. H. Travers, Miss Checkley.

Presbyterian Church Representatives—Minister, Miss J. Mair, Mrs. J. M. Fuller, Rev. A. MacDonald, Mr. Jas. Gordon.

Trinity Church Representatives—Rev. G. McColl, Mrs. J. R. Dafoe, Mrs. J. L. Boyes, Dr. Wartman, Mr. Jamieson.

Western Methodist Church Representatives—Rev. W. H. Emsley, Mrs. W. T. Gibbard, Mr. M. S. Madole, Mr. W. T. Gibbard, Mr. F. L. Hooper.

Roman Catholic Church Representatives—Father O'Connor, Mrs. McGurn, Mrs. Walsh, Mrs. J. Fitzpatrick, Mr. P. Gleason.

Agent—Chief Graham.

First Assistant Agent—Mrs. Wartman.

Second Assistant Agent—Mr. Jas. Gordon.

Medical Adviser—Dr. C. M. Stratton.

OSHAWA.

The work of the Children's Aid Society has been successfully carried on in and around Oshawa during the past year, and numerous cases of neglect have been attended to. During the past three months some 170 homes have been visited in the poorer sections of the town by our officers, and an incalculable amount of good has been done.

During the past year this branch of the Society has been greatly strengthened by new enthusiastic members, who assist the officers in every way possible.

A picnic was given to some 400 children last summer to the shore of Lake Ontario. The children were transported there free of charge, owing to the kindness of the Superintendent of the Oshawa Street Railway, Mr. D. A. Vallean. This picnic served two purposes, as not only did it benefit the poor children, but also brought before the notice of the public in general the work and aspirations of the Society.

In order to strengthen the finances of the Society, a concert was given in the Opera House. The success of this concert may be gauged by the fact that some $200 was cleared, and the work in this district put on a good financial basis for the time being.

In October last, Mr. Laverton Harris, B.A., of Toronto, addressed the members and friends of the Society upon "The Ways and Means of Obtaining a Children's Shelter." The address proved very helpful, and the outcome is that a Committee has been formed to raise sufficient funds to provide a temporary shelter for neglected children in the town and vicinity.

Too much praise cannot be bestowed upon our chief executive officer, Chief of Police Hind; and our inspector, Miss Annie Henderson. Both are untiring and enthusiastic workers, and we trust that they may both be with us for many years to assist in this great work of moulding the lives of those who, neglected and uncared for, would in time to come tend to be a menace to this community and to our fair Dominion.

The officers of the Society at present are:

Hon. President—John Cowan, Esq.

President—F. L. Fowke, Esq., M.P.

Vice-President—J. D. Storie, Esq.

Hon. Solicitor—W. E. N. Sinclair, Esq., B.A., LL.B.

Treasurer—Miss Maud Mothersill.

Inspector—Miss Annie Henderson.

Secretary—William Puckett, Esq.

Chief Executive Officer—Chief of Police Hind.

In Rural Ontario.

ORILLIA.

In connection with the annual meeting of the Orillia branch of the Children's Aid Society addresses were delivered before a fair-sized audience by Mr. J. J. Kelso, Superintendent of Neglected Children for Ontario; Mr. Alex. Johnson, General Secretary of National Conference of Charities of the United States; and Mr. J. P. Downey, Superintendent of the Asylum for the Insane, Orillia.

At the adjourned meeting the Secretary's report for the year was presented. It took the form of a resume of the aims and objects of the Children's Aid Society rather than a report of what had been done. The writer compared the condition of the children of the town, contrasting the present state of poor families with what it was a few years ago. Among other points touched upon were the general sobriety, the more comfortable appearance of school children, the laxity of truant officers, the disregard of the Labor Law by employers, cigarette smoking by young men, the want of instruction in ethics in the schools, and the necessity of providing properly equipped playgrounds for young children. The work of the Society had gone steadily forward. Homes had been visited, and advice and help given to parents who required it. There were no cases of juvenile crime before the courts and no punishment for cruelty to children. There were twelve wards of the Society in this vicinity; two were placed in foster homes; fifteen complaints investigated; ten visits paid; six advertisements in the local press; three visits of the general agents; two public meetings during the year. Several cases are at present occupying the attention of the Executive.

Mr. J. D. Knox, the Secretary, submitted the following figures: No. of wards, 12; placed in foster-homes, 2; complaints investigated, 15; visits paid to wards, 10; advertisements, 6; letters received, 60; answered, 60; applications for children, 50; visits by general agents, 3; public meetings, 3; children in the Shelter, 0.

A resolution was adopted expressing that the infants from Maternity Hospitals should be placed out under the supervision of this Society.

A hearty vote of thanks was tendered the Secretary for his faithful services.

The executive officers have a number of interesting cases in hand at the present time, and the financial statement shows a balance on hand of $80.

The election of officers resulted as follows:

President—George McKee.

Vice-President—H. T. Blackstone.

Treasurer—Wm. Grant.

Secretary—J. D. Knox.

Agent—J. R. Reid.

Solicitors—F. G. Evans and M. B. Tudhope.

The same Committees were re-appointed for 1911.

OWEN SOUND AND THE COUNTY OF GREY.

At the annual business meeting of the Children's Aid Society of Owen Sound and Grey County, the president, Mr. H. H. Burgess occupied the chair.

The Treasurer's report was most satisfactory, and was unanimously adopted, as was also the Agent's report, with instructions that it be published, and distributed to all friends and contributors to the work of the Society. It was moved, seconded and carried unanimously that the sum of $20 be granted to the matron of the shelter, Mrs. Carson, and the same amount be given to Mr. S. G. King, as a slight recognition of the services rendered by them in the work of the Society.

A public meeting was held on February 21st, in the Sunday School Room of Knox Church. The speakers for the evening were Rev. P. C. L. Harris, of Toronto, who spoke in the interest of the work of the Humane Society, and Mr. M. K. Richardson, of Flesherton, on behalf of the work of the Children's Aid Society. Both these addresses were of the best.

AGENT'S REPORT.

Mr. President and Friends,—Another year of work among the neglected and dependent children in the County has been accomplished, and I have much pleasure in presenting this report, which shows a larger number of children rescued and more work done for and among them than in any previous year.

Twenty-seven children have been made wards of the Society, twenty-two by order of Police Magistrate, and five sent up from Toronto to Owen Sound, for whom good homes have been found.

Of those committed by the Magistrate a brief history is as follows:

A beautiful baby girl, the illegitimate child of a young girl who had no home in which it could be cared for; the mother had an opportunity to go west if the baby could be otherwise provided for, and the child was soon adopted into a good home.

A complaint was laid before the Magistrate that a little girl was being brought up in unfavorable surroundings. The child was made a ward of the Society, but was allowed to stay with her mother on a promise that the condition of the home would be improved.

Starting for Homes.

A girl of eleven, whose father had deserted his family, was committed to the Society by the Magistrate at the request of the mother, who was unable to provide for all her children. The girl was adopted by the friends with whom she had been living as soon as they could be protected from any future interference.

A boy of four years was made a ward of the Society at the request of his mother, who was a widow, without the means of caring for him. A few months later she married again, and as she then had a good home and wished to have her boy, he was returned to her. The expenses of his maintenance while in the shelter and cost of travelling were refunded to the Society by the mother.

A baby girl of two days old, the child of an imbecile mother, was brought to the shelter, and afterwards made a ward of the Society. After lingering in suffering for

nearly nine months, she died without showing any signs of intelligence. The mother is now in the Orillia Asylum for the Feeble Minded.

An illegitimate boy, whose mother had no means of caring for him, was committed by the Magistrate, and has become a bright, handsome boy, for whom a good home is required.

The three younger children of a family well known in town were rescued from immoral surroundings of the worst kind. Their very name made it impossible to find them homes in this locality; the two girls have been placed in homes at a distance and the boy is with his friends.

A friendless boy of fourteen was made a ward of the Society by the Magistrate. He is not very bright, but is working and earning his own living and doing as well as can be expected of him.

A motherless girl was made a ward of the Society and removed from a home where she had been subjected to improper treatment, and was in grave danger. On her father coming to the town to live, the girl and her brother, also a ward of the Society, were allowed to live with him. This arrangement is an experiment, and will be given up if not successful.

A bright girl of ten years was committed at her mother's request, and has since been adopted into a good home in a distant part of the Province, and is now the treasured daughter in an otherwise childless home, and will do well.

Two boys of eleven and thirteen, whose mother was charged with being an immoral woman, were made wards of the Society, but were allowed to live with their father's parents, on condition that their mother left the locality.

A girl of fifteen applied for permission to stay in the shelter, as she had been turned out of her home. She proved too untruthful and dishonest to be trusted, and was subsequently sent to the Alexandria Industrial School, where she will receive the training and discipline she needs.

A baby boy, whose mother had gone insane, and who was being exposed to danger, was made a ward of the Society. It is uncertain whether he was rescued in time to prevent unhappy results, as he is far from well.

The baby boy of a mother barely fifteen years old was committed to the Society by the Magistrate, and is now in the shelter.

Two boys, aged six and eight years, were committed to this Society by the Magistrate of Dufferin County. They had never been to school and were in a deplorable state of rags; they seem smart, bright boys, and will of course be provided for by Dufferin County.

A boy was made a ward of this Society by a Magistrate in a distant part of the County, and has been adopted into a good home.

An illegitimate baby boy was committed to the Society by the Magistrate, the mother not being in a position to care for it.

There are eleven children in the shelter at present, nine of them needing good homes, while two motherless little ones are being provided for by their father.

Nearly thirty homes have been found, though not all of them have proved permanent ones, some of the children having been returned and replaced.

Between forty and fifty children have been in the Shelter during the past year for varying periods of time.

I have made sixty visits in the interests of the children, and among others I have visited those who are in the different institutions in Toronto. There are at present thirteen wards or those who have come under the Society's care for a time, receiving training and instruction in these institutions, where they have the opportunity to recover themselves if they will. If they go down irretrievably it will be because their evil tendencies and the world's temptations prove too powerful for them when they are once more at liberty.

One of the discouraging features of our work is the prevalence of immorality among young people. The history of this year's work proves this all too sadly and fully.

If only parents could be induced to exercise a more careful oversight over their children and positively forbid their being out at night without some responsible person, something important would be accomplished toward remedying this grave evil.

Among the encouragements of the work is the warm place so often found by our wards in the hearts of those who have adopted them. Some of these children have to learn for the first time what the word "home" really means, and it must be a wonderful revelation to them. On the other hand, it is often the case that they have been adopted into an otherwise childless home and add to that home's cheer and happiness in return for the care and love bestowed upon them. Many are the expressions of appreciation which come from these homes where adopted children become treasured sons and daughters.

The trial of juvenile offenders, or neglected and dependent children by the Magistrate, Mr. A. D. Creasor, has been carried on with the same kindly consideration as usual, and the timely rescue of many of our wards is due to his thoughtfulness in dealing with cases requiring the Society's care and protection.

Our Special Constable, Mr. S. G. King, has rendered valuable assistance through the year, and is becoming a terror to evil doers who are neglecting to send their children to school, or ill-treating them in any way. There are several well-known cases in Owen Sound at present where little girls are being brought up in surroundings which we are sure are unfavorable, but the difficulty of procuring sufficient evidence of the right kind makes it almost impossible to remove them. Warnings to such parents, and a general oversight, seem to be the best we can do.

J. E. Lediard, *Agent.*

Officers for 1911:

Hon. President—R. B. Miller.

President—H. H. Burgess.

Vice-Presidents—Dr. Allan Cameron, Owen Sound; M. Forhan, Owen Sound; James Shaw, Owen Sound; Mrs. D. R. Dobie, Owen Sound; Mrs. Bridgewater, Owen Sound; H. H. Miller, Hanover; E. Y. Godfrey, Meaford; N. W. Campbell, Durham; Mr. Huff, Meaford.

Treasurer—Sheriff Moore, Owen Sound.

Secretary—A. E. Trout.

Hon. Solicitor—John Armstrong.

Agent—Mrs. James Lediard.

Special Constable—S. G. King.

Executive—Mrs. H. H. Miller, Hanover; Miss Julyan, Brookholm; Mrs. E. Y. Godfrey, Meaford; Mrs. McArthur, Durham; J. C. Ryan, Rev. Father Burke, Mrs. Burgess, Miss M. Fox, Mr. J. E. Doyle, Miss Dobie, Miss Spragge, Rev. W. J. Cadman, Mrs. A. E. Trout, Mrs. Robert Shaw, Mrs. D. M. Butchart, Mrs. J. E. Forster, Owen Sound.

Corresponding Members—Mrs. Gardiner, Kemble; Dr. Hamill, Meaford; D. Knechtel, Hanover; Miss Stevenson, Thornbury; Miss Breese, Mrs. John McDonald, Chatsworth; Mrs. Pickle, Markdale; Rev. Mr. Wellwood, Mrs. J. B. Egan, Dundalk; J. O. Rourke, Shallow Lake; Carson Price, Holland Centre; Mrs. W. H. Thurston, Flesherton.

PORT HOPE.

Port Hope is a healthy, law-abiding town with no slums, yet there is every need of such an association as the Children's Aid Society, and some idea of the amount and variety of the work of the Association may be gathered from a perusal of the records of the Society. In and around Port Hope there are under the immediate care of the local Society and under the supervision of the general Association over thirty foster-children, and about these and other matters relating to the work of the Society there have been received during the year 1910 some one hundred and thirty-three communications, and according to the letter book of the Secretary some one hundred and twenty-three letters have been written.

In 1910 five children—three boys and two girls have been made wards of the Society. Of these one boy was placed with a good family in Haliburton County and two girls were sent to the Superintendent of Neglected and Dependent Children at Toronto for placement, and two small boys have been left with their parents under the supervision of the Inspector in the hope that the parents will reform and do better for their children.

Through the efforts of the Port Hope branch homes have been found, mostly with good farmers in the vicinity of Port Hope, for eight boys who were sent by Mr. Kelso.

Receipts amounted to $89 and the expenditure to $17 less.

Officers for the year 1911:

President—Rev. H. E. Abraham.

First Vice-President—Mrs. F. W. Wilson.

Second Vice-President—Rev. J. S. La Flair.

Secretary—Geo. A. Dickinson, M.D.

Treasurer—Mr. Robert Gray.

Hon. Solicitor—Mr. H. White.

Agent—Mr. A. J. Chesher.

Board of Management—The officers and the the following: Mrs. E. J. W. Burton, Mrs. T. H. Ambrose, Mrs. C. H. Moise, Mrs. R. Edmunds, Captain R. Bruce, Rev. F. J. O'Sullivan, Canon E. Daniel, Canon H. Montgomery, Mr. J. F. Clark, Mr. J. H. Helm, Mr. H. Hume.

A Sturdy Canadian.

PETERBORO.

The annual meeting of the Children's Aid Society of Peterboro County was held in the City Council Chambers. Mr. T. F. Matthews, President, was chairman.

Mr. E. L. Goodwill, Secretary, read the minutes of the last annual meeting, and these were adopted.

The work of the past year was reported upon and showed satisfactory progress in all branches; investigating cases of alleged cruelty, and neglect to children, serving warnings upon parents and others having children in charge, and where these warnings have not been followed by improvement in the homes, then having informations laid, and the parties brought before the courts, and generally caring for all alleged and dependent children brought to our attention in this city and County.

Mr. Cochrane and the Secretary have attended all trials before the Magistrate, relating to juvenile offences, as well as the investigations and trials of those charged with neglect and ill-treatment of children. In this connection was placed on record the appreciation of the assistance furnished by Mr. Kelso, in having Mr. Gunton and also Mr. Miller act with and strengthening the hands of the Society in several important matters.

The homes containing wards have all been visited during the year, and the Society received on the whole very encouraging reports from the Government Inspectors. The demand for children for adoption has been, as in former years, for children from ten years upward, but the majority of the children passing through the hands of the Society have been under nine, so that the Shelter has been in a congested state almost continuously throughout the year.

The Shelter has, as usual, been kept up to a high standard of efficiency under the care of Mr. and Mrs. Henry, to whom too much praise cannot be given for their careful attention and care given to the children.

The financial position of the Society was reported upon and showed a very satisfactory balance on hand.

A number of the ladies of the Board of Management for the last year had left, and Mr. Burnham thought that they should be sent letters of appreciation for the faithful service they rendered while on the Board. This was decided upon.

Election of Officers.

Mr. Cochrane then took the chair and the election of officers for the coming year was proceeded with. The new officers are as follows:

Hon. President—Mayor Morrow.
President—Mr. T. F. Matthews.
Vice-President—Mr. T. F. Matthews.
Vice-President—Mrs. Birdsall.
Second Vice-President—Mr. Travers.
Secretary—Mr. E. L. Goodwill.
Treasurer—Mr. P. Campbell.
Hon. Solicitor—Mr. Goodwill.
Hon. Physician—Dr. Amys.
Agent—Mr. Geo. Cochrane.
Board of Management—All the old members of the Board were re-elected, with the following new members: Mrs. Pearce, Mrs. Ruddy, Mrs. Hopwood, Mrs. Gibbs, and Judge Huycke. Mrs. Hopwood and Mrs. Scott were elected to the Sewing Committee.

PARRY SOUND.

The first annual meeting of the Children's Aid branch of Parry Sound district was held in the Methodist Church. Rev. F. W. Mahaffy presided over the meeting.

Rev. C. W. Watch congratulated the Society on the good work they had accomplished during this their first year.

Rev. W. B. Tighe also spoke on the work of the Society, pointing out the great possibilities in the children saved from a life of crime and poverty.

On Sunday evening, after the church service, a mass meeting was held in the Court House, when Rev. C. R. Miller, of Berlin, addressed an audience respresentative of every church denomination in town.

The Agent's first annual report contained the following information:—The Parry Sound branch of the Children's Aid Society was organized on August 1st, 1909, with the following officers: President, Rev. F. W. Mahaffy; vice-presidents, Sheriff Armstrong, the resident ministers and captain of the Salvation Army; secretary, treasurer and agent, Mr. Joseph Ryder. In addition to the above officers the following ladies were elected

as a local committee: Mrs. George Rowlison and Mrs. F. L. Walton, for the Methodist Church; Mrs. Gartshore and Mrs. R. W. George, for the Presbyterian Church; Mrs. J. A. Dwyer and Mrs. James McAvoy, for the Roman Catholic Church; Mrs. A. T. Hagan and Mrs. Edd Taylor, for the Anglican Church; Mrs. M. Slade, for the Baptist Church.

The work of the organization was not confined to Parry Sound, and several cases were dealt with in the surrounding district.

Ten children have become wards of the Society during the year, and all these but one have been placed in comfortable and respectable homes, and have given evidence of improvement in health, morals and manners.

Over twenty visits were made at the Police Court in connection with children who were in need of help, and also on behalf of boys who were guilty of bad behaviour. We are glad to say that in all these visits the Magistrate and Police officials have shown consideration and sympathy with the Children's Aid movement, and have co-operated with us in the endeavour to improve the morals of children exposed to evil influences.

The local organization has also been useful in looking after the interests of children sent into the town and district from the headquarters of the Society.

We gratefully acknowledge the assistance given us financially from the Parry Sound Literary Society, to the extent of $25; also the offering from the Union service conducted last year, which amounted to $16.29.

Mr. Joseph Ryder was unanimously re-elected to continue his duties as the Society's Agent for the ensuing year, and Rev. J. W Kirkpatrick was elected president. Revs. C. W. Watch, S. W. Mahaffy, R. A. Cowling, W. B. Tighe, and Father Neault were elected vice-presidents.

PICTON.

Good work has been accomplished by the Picton and Prince Edward County Society during the past year. Eleven business meetings have been held, and one public gathering, at which Mr. J. J. Kelso was present. A number of cases have been dealt with successfully. The first consisted of four children, whose mother had deserted them. These the Society took care of at the request of the father, who pays toward their support. All four have been placed in good foster-homes.

The infant child of a feeble-minded young woman has also been taken care of and placed with the officers of the shelter at Belleville.

A young girl who was found living in a disorderly house was rescued from her dangerous surroundings.

Three other children who were deserted have been placed in foster-homes after a short stay in Belleville shelter; and four others, belonging to one family, have also been rescued from immoral surroundings and placed with the Belleville shelter.

In addition to these special cases there have been many warnings to parents and investigations conducted which have awakened a sense of duty in those dealt with.

The following officers were elected:

President—T. C. Tice.

Secretary—Mrs. J. W. Hamly.

Treasurer—H. C. McMullen.

Agent—Rev. W. L. Armitage.

Assistant Agent—Miss Cunningham, Deaconess.

Solicitor—J. R. Brown.

Also a Council of ten members, together with the Mayor and County Warden.

RENFREW.

This Society is able to report a continued activity and success in dealing with the neglected children of the neighborhood. The Local Council at its regular meeting endorsed the work and efforts of the Society in a practical manner by voting a grant of $25 to their funds.

Later on a most pleasing incident happened at Christmas time, when the Rev. W. H. M. Quartermaine, President of the Society, received the following letter from the Fire Chief, Mr. D. H. McAndrew:

December 20th, 1910.

Dear Sir,—As a means of conveying our thanks to the Omnipotent Hand that has protected us during the past year, I am instructed to donate to the Children's Aid Society the sum of Two Hundred Dollars from the several Companies of the Fire Brigade as follows:—North Ward Reel Co., $50.00; Centre Reel Co., $50.00; South Ward Reel Co., $50.00; Hook and Ladder Co., $50.00, to which I beg leave to add the Chief's donation of $50.00—making in all Two Hundred and Fifty Dollars; which, on behalf of the several companies and myself, we wish you will accept, and in the hope that it will prove a blessing and relief to some who have been unfortunate. And also wishing that your Society may receive the Divine blessing upon the noble work you have undertaken, I am, on behalf of the several Companies,

Yours very sincerely,

D. H. McAndrew.

Country School.

The Society was more than pleased with this Christmas present, and those interested now see the possibility of having the much needed shelter in Renfrew for neglected and dependent children.

The officers of the Society are as follows:

Hon. President—Mayor Gravelle.
President—Rev. W. H. M. Quartermaine.
First Vice-President—W. H. Kearney.
Second Vice-President—Mr. Armstrong.
Third Vice-President—John Devine.
Secretary-Treasurer—E. J. Stewart.

SARNIA AND LAMBTON COUNTY.

The annual meeting of the Children's Aid Society of Sarnia and Lambton County was held in the Public Library.

The auditorium was found too small to comfortably hold the large gathering who assembled to greet the Hon. W. J. Hanna, who was the speaker of the evening.

An opening hymn was sung and the Rev. W. H. Barraclough was asked to lead in prayer.

The President, Geo. A. Proctor, then emphasized a few of the good things the Society had been the means of doing for the neglected and dependent children of the town and County.

The Secretary, Mr. Wilkinson, read his annual report as follows which, on motion of Mayor Johnston and J. F. Elliott, was approved:

This report completes the twelfth year of the organization and work of this Society, and in all one hundred and twenty-three children have been made wards.

The year has been one of continued progress. Thirteen children have been made wards, all of them directly through the Court, either because of their own delinquencies or because of unworthiness or incompetence of parents or guardians to care for and provide for them.

Thirteen children have been changed to other homes and four restored to their parents; 259 interviews have been held about children, 68 applications received, 41 complaints reported for investigation, 385 calls or visits made in town, 225 out of town. The Agent attended Court 21 times, 378 letters were received, 432 written, supplied clothing to 36 individuals or families, 12 children have been cared for in the Shelter, mostly for short periods, as homes have soon been available.

A pleasing incident of this year was that two mothers, whose troublesome boys had been placed by him in the County, had made it their business to come and personally report their unqualified satisfaction and pleasure in their progress and homes, on their return from a short visit with them and their foster-parents, this summer.

H. Ingram then read the report of the Treasurer which, on motion of Rev. J. J. Paterson and seconded, was approved.

Election of officers:

President—Geo. A. Proctor.

First Vice-President—G. L. Phillips.

Second Vice-President—W. F. Lawrence.

Secretary and Agent—John Wilkinson.

Treasurer—H. Ingram.

Solicitor—R. V. LeSeur.

Auditors—Geo. S. Samis, J. F. Elliott.

Executive Committee—R. G. McArthur, A. McLean, J. F. Elliott, F. C. Watson, Rev. J. R. Hall, John Ferguson, Geo. S. Samis, Mrs. W. F. Lawrence, Mrs. D. Clark, Mrs. A. J. Johnston, Mrs. T. F. Towers, Mrs. Hanna, Mrs. H. Ingram, Mrs. Wm. Ellis, Mrs. Geo. S. Samis, Mrs. John Dyble, Mrs. C. Stratford, Mrs. Geo. Brown.

Hon. W. J. Hanna then addressed the meeting in his forceful and entertaining way, taking up in brief the work of the Children's Aid Societies, its extension, the new methods which had been so successfully carried on by Mr. Kelso, the superintendent, and his assistants, speaking also of the continued interest and activity of the Lieutenant-Governor of Ontario, Hon. J. M. Gibson, who, he said, found time and opportunity to help the work of the societies.

PORT ARTHUR AND FORT WILLIAM.

A movement is on foot to bring about a union between the Port Arthur and Fort William Children's Aid Societies, with a view to accomplishing better results for the large district surrounding these towns. An agent could then be appointed to give all his time to the work, and a shelter secured. At the present time the interest in the

work is confined to a few, who have to give more time to the affairs of the societies than they can conveniently spare from their own business. However, during the year several cases have been investigated and action taken, and the societies are always willing to give help when called upon. Mr. J. Bowman is President of the Port Arthur Society, while at Fort William Mr. A. Snelgrove is President, and Mr. F. E. Trautman Agent.

ST. THOMAS.

On Tuesday, October 25th, 1910, the sixteenth annual meeting of the Children's Aid Society of St. Thomas and Elgin County was held at the Shelter, 113 Wellington street, at 8 p.m., wih Sheriff D. McColl, President, in the chair, and a large attendance of members.

During the evening the following reports were listened to with sympathetic interest. Among other items of interest the Secretary reported a large number of children have been cared for in the Shelter for short periods and returned to their parents. There are cases of neglect, cruelty, overcrowding and evil example in the city which the society might profitably give attention to.

Children cared for in the Shelter, 29. City children received, 4 boys, 7 girls; committed by F. Hunt, County Police Magistrate, 5 boys, 6 girls; received from other societies, 3 boys; returned from foster-homes, 3 boys, 2 girls; apprehended for offence, 1 boy.

How disposed of:—Placed in foster-homes, 9 boys, 7 girls; returned to parents, 4 boys, 7 girls; sent to Industrial School, 2 boys; in Shelter at end of year, 2 girls.

The following persons are now life members of the society: J. A. Kilpatrick, Mrs. J. A. Kilpatrick, J. F. Langan, Dr. A. Leitch, C. H. Hepinstall, A. M. Hutchison, Mrs. E. L. Sweet, Dr. C. W. Marlatt, Mrs. J. E. Shepherd, Mrs. McColl, George Wegg, W. R. Jackson, and F. B. Holtby

The work of the society is meeting with the sympathy of the general public. It is encouraging to those who are actively engaged in the work to be favored with expressions of approval from the County Council, the Grand Jury, and the Police Magistrate of Elgin County.

The thanks of the society are due to Dr. D. A. McKillop for attendance upon the children in the Shelter when his services were needed, and also Dr. Emory A. Clark for caring for the teeth of children in the Shelter. Both of these gentlemen have rendered valuable services in ministering to the little ones.

In speaking of the reports, Frank Hunt, County Police Magistrate, said that there is a more friendly feeling toward the Society and its work than there was some years ago. The public is realizing that the Society is doing a splendid work in the community. He has had before him many delinquent children, but has not committed to the Shelter any who could be kept at their own homes under the supervision of the society's officers. However, there are times when, for the child's good, it is necessary to remove it from home, and the Society has the right to do this.

The following officers were elected:

Honorary President—D. McColl.

President—C. W. Marlatt, M.D.

Vice-Presidents—F. B. Holtby, G. K. Crocker, A. M. Hutchison, A. Leitch, M.D.

Treasurer—H. S. Wegg.

Secretary—W. J. Shaw, City Hall.

Board of Management—Mrs. G. K. Crocker, Mrs. J. H. Wilson, Mrs. W. E. Youmans, Sheriff McColl, Mrs. E. A. Smith, Dr. C. W. Marlatt, Dr. A. Leitch, F. B. Holtby, H. S. Wegg, A. M. Hutchison, W. J. Shaw, K. W. McKay, representative of the County Council, and the Mayor of the City.

Shelter Committee—Mrs. G. K. Crocker, Mrs. J. H. Coyne, Mrs. J. M. Green, Mrs. J. H. Wilson, Mrs. W. E. Youmans, Mrs. E. A. Smith, Mrs. G. A. Anderson, Mrs. A. L.

Garland, Mrs. A. Leitch, Mrs. S. O. Perry, Mrs. C. St. Clair Leitch, Mrs. D. McColl, Mrs. J. H. Carrie, Mrs. John E. Shepherd, Mrs. John Farley, Miss M. Langan, Miss A. King, Mrs. W. R. Jackson, Mrs. E. L. Sweet.

Day Nursery Committee—Mrs. E. A. Smith, Mrs. E. L. Sweet, Mrs. J. H. Carrie, Miss M. Langan, Mrs. J. H. Wilson, treasurer.

STRATFORD AND PERTH COUNTY.

The Children's Aid and Humane Society of Perth County has been in existence for several years, but has been particularly active and popular during the past year, largely owing to the fact that it has now a good Agent in the person of Rev. Hugh Ferguson, who was appointed about a year ago, and has worked up a great deal of enthusiasm and co-operation among the philanthropic people of the district. He was formerly Presbyterian minister of Queensville, Ont. The President of the Society is Sheriff Magwood, who is well known throughout the County, and brings considerable strength to the cause. Mayor Dingman, proprietor of the *Herald*, is also deeply interested, and both he and Mr. O'Beirne, editor of the *Beacon*, have given a great deal of space in their newspapers to the Society's work. The Society has branches at St. Mary's, Listowel, Mitchell, etc., and a united effort is made to reach and benefit every child. Kindness to animals and protection from cruelty is also part of the Society's work, a special committee having charge of that branch. Mr. George McLagan, a well-known citizen of Stratford, is chairman of the finance committee, and has given much time to collecting funds for the new Shelter. Mr. W. R. Marshall headed the subscription list with $500 and also sold the Society a building on advantageous terms.

A Tenement Playground.

Mr. Ferguson reports as follows:

The following is a brief summary of our work for the year.

Sixteen children made wards; six of these given back temporarily to their parents to be under the oversight and control of the Society. Here, through the probation plan the best kind of work is done.

Choice foster-homes have been found for the remaining ten and they are now happy and doing well.

Six others have been provided with good foster-homes.

During the five weeks previous to the beginning of this year, seventeen children were made wards, making a total of thirty-three children made wards of the Children's Aid Society in Perth County since Sept. 30th, 1909.

During the year decided improvement has been brought about in twenty families where the lives and mortals of seventy children were affected, without removing them from their homes.

The humane part of the work has also been kept prominent. Two cases of gross cruelty to animals were dealt with effectually in court, and in many cases animal life improved by warnings given.

Approximately speaking, over $800 has been raised during the year for the support of the work outside of Mr. W. R. Marshall's offer of $500 toward providing a children's shelter.

Good service was rendered by Mr. Ferguson as a visitor to children in foster-homes. During the summer he visited the children in 40 foster-homes in the county of Perth and 114 in the county of Simcoe. With very few exceptions the conditions in these homes are highly satisfactory and the children doing well. It is being proven that this is a good way to dispose of neglected children, and it is good for those who adopt them.

Finances.

The report of the Treasurer, Mr. W. Maynard, was as follows:—

Receipts—Balance, Nov. 1, 1909, $141.88; county of Perth, $50; town of St. Mary's, $50; township of Downie, $25; township of Logan, $25; township of Fullarton, $25; township of Elma, $20; village of Milverton, $10; city of Stratford, $300; city of Stratford, for maintenance of wards, $90.40; county of Perth, $112.50; town of St. Mary's, $20.28; Listowel Branch, $69.85; subscriptions collected, per Rev. H. Ferguson, $358.09; Mrs. Benson, $16.58; Mesdames Hepburn and Hollis, $15.03; paid direct to treasurer, $40; per Sheriff Magwood, $36.15; contributions, Knox Church Young People's Society, $5; sundry, $9; debenture maturing, $500; interest on debenture, $12.50; on savings bank account, $8.50; refund by Mrs. Reynolds (over payment), $3; total, $1,949.26.

Expenditure—Agents' salary, 12½ months, $625; travelling expenses, $101.52; office rent, $36; telephone, $11.46; printing, $5.75; cab hire, $1.25; clothing, $12.25; drugs, 94c.; maintenance of wards, $206.77 debenture, city of Stratford, $500; total, $1,500.94; balance of cash on hand, $448.32.

The Society holds a debenture of the city of Stratford of $500, bearing interest at 5 per cent., maturing Jan. 1, 1940.

In addition to the $206.77 mentioned in the Treasurer's report for maintenance of wards, $107.41 was paid out by Mr. Ferguson as follows: Received from town of St. Mary's, $21.94; county of Perth, $105.75; total, $127.69; the balance, $20.28, being paid over to the Treasurer and credited to the town of St. Mary's.

The Officers Re-elected.

It was moved, seconded and carried that the entire body of officers be re-elected. All officers accepted the re-election gladly, and the following replied, tendering their thanks: Sheriff Magwood, president; Ald. Carter, vice-president; Wm. Maynard, treasurer; and Miss Macpherson, secretary.

COMMITTEES.

Humane Committee—Dr. Hughson, chairman; Thos. Dunseith, Mrs. A. R. Benson, Mrs. J. Bottomley.

Advisory Committee—Sheriff Magwood and Mr. J. J. Coughlin.

Finance Committee—Mr. George McLagan, Sheriff Magwood, Mr. W. Maynard and Miss Macpherson.

County Executive Committee—All the officers of this Society and the chairman of each auxiliary.

Ladies' Visiting Committee—Mesdames J. Rankin, G. McLagan, Megan and T. Balantyne.

VISIT OF LIEUTENANT-GOVERNOR.

A notable event was the visit of the Lieutenant-Governor, Hon. J. M. Gibson, in October. A luncheon and reception were provided by the citizens of the City Hall, and a number of addresses were made. The visit was greatly appreciated, and did much to encourage and stimulate the friends of the Society.

BRANCH SOCIETY AT ATWOOD.

That the Children's Aid and Humane Committee of Atwood is a living force for good in the social life of Elma Township was evidenced recently, when three children were lifted from unfavorable environments and, by order of His Majesty's justices of the peace, Mr. T. G. Ratcliffe, of Atwood, and Mr. A. Chalmers, of Monkton, made wards of the Society. This make a total of eight children of Elma township made wards of the Society since September 30, 1909.

The value of this work on the future good citizenship of the country can scarcely be over-estimated, as the Society, as soon as possible, finds approved foster-homes for their wards, where, with few exceptions, they grow up to be good and useful citizens.

Rev. Hugh Ferguson, the Society's District Agent, who assisted in dealing with this case and who has recently spent several days in work for the Society around Atwood, expresses himself as much pleased with the excellent work being done by the Atwood branch.

The Society are grateful to Dr. Kidd, of Atwood, for his kindness in giving them the use of a room in his residence in which to hold the court.

MITCHELL.

The Children's Aid and Humane Committee of the Town of Mitchell, a Branch of the Children's Aid and Humane Society of the County of Perth, elected the following officers:

Hon. President—Mayor Campbell.

President—T. H. Race.

1*st Vice-President*—B. J. Schneider; 2*nd Vice-Presidents*—Resident Clergymen.

Secretary—Rev. John Kenner.

Treasurer—F. A. Mann.

Membership Committee—Mrs. Rankin, Miss Dawson.

Furnishing Committee—Mrs. John Coppin, Convener; Mrs. T. Macpherson, Mrs. J. Rankin, Mrs. F. A. Campbell, Mrs. W. W. Hicks, Mrs. W. Porteous, Mrs. C. Johnson, and Mrs. H. Porterfield.

Humane Committee—W. Shillinglaw, V.S., Alfred Price, and Constables Cooper and Timms.

SAULT STE. MARIE AND ALGOMA DISTRICT.

A notable advance in Children's Aid work was the appointment of Mr. J. P. Reed as Agent and District Representative of the Children's Aid Society, with headquarters at Sault Ste. Marie. His experience in Y. M. C. A. and kindred work, together with his natural ability and good judgment, afford every confidence that he will do a splendid work for the children and the Province. The following report of the annual meeting was taken from one of the local newspapers:

Children's Aid Society Did Good Work.

The annual meeting of the Children's Aid Society of Sault Ste. Marie was held Monday afternoon, October 24th, 1910, in the Council Chamber. The attendance was excellent, there being a goodly number of ladies and gentlemen present, besides nearly all the ministers of Sault Ste. Marie and Steelton.

J. P. Reed, the Society's Agent, gave a brief report of the year's work. Sixteen cases were dealt with directly, involving the welfare of forty-seven children. Of this number forty-one were made wards of the Society, three were sent to the Victoria Industrial School at Mimico and four were given another chance and are doing nicely. Of the forty-one wards, five have been given back temporarily to their parents, thirty-five have been placed in foster homes or sent to Toronto, and one is still unplaced. After paying all the running expenses there is a balance of $25 to the good.

There are seventy-five wards of the various societies of Ontario placed in the Algoma District, nearly all of whom were personally visited by the agent, and in almost every case found to be comfortably situated.

Five families have been visited and given friendly advice along the line of making things brighter and neater for their children, and in some cases there is marked improvement, while others will require a little more attention.

The Society enters upon a new year with bright prospects of success and is confident of doing a much better work for the boys and girls of the District. There is still opportunity for more men and women to give of their time and means to forward this great labour of love.

From a Rural District.

The following ladies and gentlemen were selected to be the office-bearers for the ensuing year:

President—D. I. Millar.

Vice-Presidents—F. A. King, Mrs. W. H. Ewing and Mrs. J. O'Boyle.

Secretary—C. R. W. Scouten.

Treasurer—R. G. Campbell.

Honorary Solicitor—P. T. Rowland.

Agent—J. P. Reed.

Board of Management—Mrs. W. A. Smith, Mrs. A. J. Parker, Mrs. Pollard, Mrs. E. King, Mrs. T. G. Foster, Mrs. Jewell, Mrs. John Wright, Mrs. Dyson, Mrs. J. F. Beattie, Mrs. Farquhar, Mrs. Mack, Mrs. Shampeny, Mrs. W. G. Kerr, Mrs. J. H. Scott, Mrs. J. O'Boyle, Mrs. Audette, Mrs. J. J. McCormick, Mrs. R. H. Knight, Mrs. R. H. Carney, Mrs. J. A Shannon, Mrs. Kemp, Mrs. O. Davis, Misses Dickie and Johnson, Mrs. W. Keetch, Mrs. A. Smith, Mrs. C. Rose, Mrs. Hart and Mrs. Murchy; Messrs. W. R. Cunningham, G. Williams, W. H. Ewing, G. W. Rudlen, P. V. Symes, A. M. Peters, Dr. A. A. Shepard, A. R. Johnson, C. E. Sullivan, N. C. Mansell, L. P. Tischart, W. J. Detweiler, Adjutant Campbell, Ald. J. Stevenson, Mayor J. Lyons, A. Becker, H. Rogerson and J. Ironsides, and I. J. Downey, Chief of Police.

Note—Owing to the unexpected death of the newly-elected President, N. T. Simpson, ex-Mayor, was elected at a special meeting to fill the vacancy.

Planning for Shelter Building.

A liberal response has been made so far to the efforts of the committee of men and women who are waging a membership campaign for the benefit of the Children's Aid Society. From all quarters come encouraging reports. The movement is a popular one and the membership fee has purposely been fixed at a small figure so that all may join in the movement.

The society plans to possess itself with a temporary shelter to be used for the care of children until homes are found for them, and in a short time expects to be well-equipped.—*Sault Ste. Marie News*, February, 1911.

SIMCOE AND NORFOLK COUNTY.

The annual meeting of the Children's Aid Society of the County of Norfolk was held in the Council Chamber, Simcoe.

The annual report of Mr. D. E. McIntosh, Secretary-Agent, is herewith appended:

In reviewing the work of the past year it is gratifying to state that in many cases of alleged neglect of children, by visiting the families complained of, and serving the usual warning notice, a decided improvement has taken place, both as to the sanitary conditions of the homes, resulting in a better moral atmosphere and a stricter observance of the Truancy Act, thus putting the child in a much better condition for receiving an education. In all such cases I have deemed it unnecessary to apprehend the children, therefore, the ties that bind parent and child have not been severed, but rather bound firmer. The removing of a child from its home and parents is a serious matter, and it has only been done throughout the year as a last resort. It is also gratifying to be able to say that I have had the friendly co-operation and support of the clergy and all in official positions throughout the county, greatly stimulating us in our work.

We desire to express our gratitude to the County Councils of 1910 and 1911 for their liberal grant of $100 for each of these years.

During the year and up to the present time we have taken in charge twenty children.

I have visited a goodly number of schools in this country during the year to ascertain from the teacher if any children of the compulsory school age were not attending. If any were found, the usual warning notices were served upon the parents, with good results.

In Training.

Pets Keep Boys Contented.

In visiting the schools I have made it a practice to give a practical talk to the children, endeavouring to impress upon the minds of the pupils the importance and value of the time between the ages of eight and fourteen years.

Last summer I had the pleasure of visiting the children in foster-homes in this county and found but two out of sixty who were ill used, the others were in first-class homes, contented and happy. The two referred to were promptly removed to other quarters.

With some degree of pride, I mention the fact that Mr. J. J. Kelso, the Superintendent of the neglected and dependent children of Ontario, has appointed me as his agent to deal with any cases of child desertion or neglect. Mr. Kelso's letters to me have been of the most friendly and encouraging type, which have greatly strengthened my hands.

The people are becoming more familiar with the aims and objects of our work, which will, no doubt, tend to greater liberality and readier responses to our appeals for financial aid in carrying it forward. Religious and denominational defferences are narrowing down, and Protestant and Roman Catholic meet in Children's Aid work as on common ground, and in the very best harmony.

In concluding this report I desire to thank all, who either by kind word or deed, have assisted in carrying forward this best of all missionary movements, and all may rest assured that so long as I occupy my present relation to the Society, no child will ever be removed from its home and parents who has a reasonable chance for growing up to a respectable and useful life.

Officers:

President—Mr. Frank Reid.

Vice-Presidents—Messrs. H. S. Macpherson and G. Williamson.

Treasurer—Mr. Elias Boughner.

Secretary—Mr. M. L. House.

Agent—Mr. D. E. McIntosh.

Executive Committee—Local clergymen and Messrs. H. F. Cook, I.P.S., J. D. Christie, W. A. Skirrow, J. W. Hagan and J. B. Jackson.

Auditors—Messrs. Munro and Wedd.

TEMISKAMING DISTRICT.

A Society was formed to deal with this district in November last, largely as the result of a visit from Mr. Gunton. Since the appointment of Mr. N. J. McAulay as Executive Officer good work has been accomplished. During the first two months of the Society's existence ten homes were visited. Thirty children, either neglected or in poor circumstances, have been in some way assisted by the Society. In some cases it was found necessary to bring the father or guardian before the proper authorities for non-support of his wife and children, with good effect.

One case in particular was taken up, in which the father had been spending his money in getting drunk continually and giving little or no support to his wife and six children. On being brought before the Magistrate he was convicted for non-support, but he was discharged on suspended sentence, promising to do better, and we are glad to say that there is a great improvement. The father has been staying at home ever since, providing for the family, and three of the children are now going to school. There are two other cases of a similar nature, in which it may be necessary to take the children.

The most of the work done so far has been in Cobalt, Haileybury, and North Cobalt, but a tour will be made over the whole district in the near future.

During the month of January, 1911, the Society has accomplished the following useful work:—Number of children's cases investigated, 25; neglected and poor homes

visited, 10; number of cases before the Magistrate, 5; out on suspended sentence, 4; sent to Provincial Superintendent, 1; warning notices served, 4. In addition to the foregoing a number of poor children were assisted with clothing, etc., and are now attending school.

MATHESON.

Whilst visiting Matheson recently the Agent called on two families, and warned them to send their children to school. A few of the citizens were also called together in the afternoon and organized into a Children's Committee as follows:

President—W. R. Shields.

Secretary—Mrs. D. Johnson.

Mrs. Geo. Burton, Mrs. Ed. Monahan, Mrs. C. Quist, Mr. N. E. Johnson.

UXBRIDGE.

During the year a family of children living on the outskirts of the town were looked after. They were in a depraved home and sadly neglected. Three of the smaller children were removed and placed in good foster-homes.

A large number of cases have come under notice during the year, but a kindly warning with some wholesome advice goes a long way in straightening out these troubles.

The Society exerts a silent influence over the community which has a far-reaching and wholesome effect.

OFFICERS.

President—T. C. Nicholls.

Vice-President—Dr. Baird.

Secretary—T. F. Thompson.

Solicitor—W. S. Ormiston.

WOODSTOCK AND OXFORD COUNTY.

Important advances have been made by the Children's Aid Society in this district during the past year, the Rev. C. S. Pedley having been appointed Secretary and Inspector with a decided advance in the work as a result.

Mr. Pedley writes:—

A gratifying event of the year was the talent tea given by the Daughters of the Empire in the summer to provide funds for special cases of destitute children, the sum of $84 being realized.

Attended court on fifteen occasions in the interests of children. Twenty children have been made wards of the Society by Magistrates' order, and most of them provided with good homes.

During the year some twenty-five children have been received into the temporary shelter under the care of Mrs. Williamett, who has proved herself invaluable as guardian and friend of the children in her home.

These figures represent only a few of the children who, in one way and another, have required the attention and care of the Society. We have become acquainted with the circumstances of at least 200 children, who were proper subjects for the application of the "Children's Protection Act." Many of them have been helped materially.

The thanks of the Society are due to the ladies of the Committee, who looked after the clothing of the children of the Shelter, and to all the ladies who have contributed garments or material.

Children in Farm Homes.

Early in the year the ladies of the Committee formed themselves into a separate section for the purpose of enlisting members, with Mrs. George Smith as convener and Mrs. W. L. Mackay as secretary.

Our thanks are due to the Magistrates, Mr. A. S. Ball. P. M., city; Dr. Harvey, P. M., Norwich, and Mr. Hare, P. M., Tillsonburg, for their ready co-operation with the Society.

Officers of the Society:

President—John Butler.
First Vice-President—F. R. Ball.
Second Vice-President—Dr. McMullen.
Agent and Secretary—Rev. C. S. Pedley.
Treasurer—A Hastings.
Executive Committee—Mrs. W. L. McKay, Mrs. Geo. Smith, Miss Egan, Miss Pyper, Mrs. Spracklin, Mrs. Dickert, Miss Stone, Miss Magwood, Mrs. Frank Hyde, Charles Taylor, Drumbo; D. C. Rowe, Hickson; Charles Budd, Folden's Corners; A. S. Wells, Princeton; Dr. Stevens, R. E. Butler, Mr. Kirk, Chief Thompson, W. S. Bean, and George Parker.
Special Committee—The clergymen of the city.
Auditors—H. Sproat and E. J. Coles.

TAVISTOCK.

A reorganization of the Children's Aid Branch at Tavistock took place recently, when the following officers were elected:
President—Rev. Mr. Stevenson.
Vice-President—Mr. McDonald.
Treasurer—Miss McDonald.
Secretary—Miss M. Zimmerman.

WALKERTON AND BRUCE COUNTY.

The annual meeting of the Society for Walkerton and Bruce County was held in the Town Hall, Walkerton, November 11th, Mr. Alex. Shaw, K.C., presiding. An important advance made has been the appointment of Rev. D. McLennan as Agent for the County. He has made good progress since taking office and in addition to investigating and taking needed action for the protection of children, has organized the following branches:

At Wiarton—with J. J. Tyson as President and James Patterson as Secretary-Treasurer.
Paisley.—President, Dr. A. H. Allen; Secretary-Treasurer, J. C. Gibson.
Southampton—President, P. Knechtel; Secretary-Treasurer, E. J. Mitchell.
Port Elgin.—President, J. A. Chapman; Secretary-Treasurer, J. J. Busby.
Similar branches will be organized at Kincardine and Lucknow.

The officers of the County Society are:

President—A. Shaw, K.C. (since deceased).
Vice-President—A. W. Robb.
Treasurer—J. Morgan.
Secretary—Rev. D. McLennan.
Directors—Mrs. Benton, Mrs. MacNamara, Miss Roether and M. MacNamara.

WINDSOR.

The annual meeting of the Windsor branch of the Children's Aid Society was held in the Council Chamber of the City Hall. Judge McHugh, the retiring President of the Society, occupied the chair, and gave an interesting account of the work of the Society during the past year, showing that the local branch has been quite active, several children having been taken in charge and either placed in foster-homes or cared for in some manner. Judge McHugh, in his address, complimented Sergeant Jackson for the success of his efforts in the line of reporting cases of children in need, and the sum of $25 was voted him as a slight compensation for his service for the year closing December 31st, 1910.

The report of the Treasurer, Dr. W. A. McDonald, showed that there was $100 on hand.

The following resolution regarding Mrs. Charles Read Banks (nee Miss Agnes Holton), who has efficiently held the office of Secretary of the local branch of the Society during the past year was drawn up and adopted:

"That whereas Miss Agnes P. Holton, who has been the Secretary of this Society since the 23rd of March, 1909, has tendered her resignation on the eve of her intended marriage and removal from the city, be it therefore resolved that she be given the hearty thanks of the said Society for her valuable services in connection therewith. During her term of office Miss Holton has most efficiently performed the duties thereof and shown her sympathy with the aims and objects of the society in endeavoring in every way to promote its welfare. The Society, while regretting the loss of her valuable services, do hereby express their best wishes for her future happiness in her new sphere of life."

Election of officers:

President—F. P. Gavin.

First Vice-President—Sheriff d'Avignon.

Second Vice-President—Frank Hutton.

Treasurer—Dr. W. A. McDonald.

Solicitor—Henry Clay.

Secretary—Mrs. Boomer.

Management Committee—Miss McKay and Miss Maggie Bartlet of the Presbyterian Church; Mrs. E. G. Henderson and Miss Treble of All Saints' Church; Mrs. DeGurse and A. P. E. Panet, representing the Catholic Church; Mrs. York of the A. M. E. Church; Arch. McNee and Mrs. A. C. Kanady of Bruce Avenue Baptist Church; Frank Hutton and Mrs. N. J. Clinton of the Methodist Churches, and Dr. Carney Francis Cleary, Dr. Pepin and Dr. Smith, additionals.

YORK COUNTY.

York County has now a Children's Aid Society. This new organization, which has been under consideration for some time, was completed at a mass meeting of the members of the York County Council held in the County Buildings, Adelaide Street East. The necessity for such a Society was explained by W. A. Gunton, of the Provincial Office. He pointed out that although the Toronto Society had occasionally taken charge of County children, the city work has grown so that city officers would now have no time for County work. It would not be necessary for the County to erect a building, as the Toronto shelter on Simcoe Street was prepared to take care of children pending their transfer to foster-parents at a cost of $2 per week.

This new Society is organized under the Provincial regulations, which empower a qualified Agent to remove neglected children from their parents. Children found begging or in indecent surroundings are open to commitment to the care of the Society.

The newly-elected officers are:

Prcsident—Reeve Geo. S. Henry, Oriole.

Secretary—John A. Ramsden, County Clerk.

Vice-Presidents—William H. Pugsley, Richmond Hill; William Keith, Newmarket; John Gardhouse, Highfield.

Treasurer—W. D. Annis, Scarboro.

Hon. Solicitors—T. H. Lennox, M.P.P., Aurora, and James Baird, K.C., County Crown Attorney.

The matter of appointing an Agent was left to a Committee.

GRAVENHURST.

The annual meeting of the Children's Aid Society of Gravenhurst was held on November 23rd, 1910. Four regular and two special meetings were held during the year. There have not been very many cases to claim the attention of the Society, but four homeless chilidren were sent to Mr. Kelso that foster-homes might be obtained for them, and one boy was placed in the Asylum at Orillia.

The following is a list of the officers:—

President—W. H. Gallichan.

Vice-President—Dr. Grant.

Secretary—Mrs. Minns.

Treasurer—Joseph Graham.

Committee—Rev. T. Edwards, Rev. D. A. McKeracher, Dr. Cartwright, Messrs. Hobbs, Williams, Sloan, Glen, Minns and Groves; Mesdames Mickle, Gossage, McPhee, Sharpe, Ditchburn, Ryan, Gallachim, Graham, Fournier and Brennan.

OTHER BRANCHES.

Children's Aid branches exist at a number of other points, but reports were not received in time for publication.

INDUSTRIAL SCHOOLS.

Following are the Reports of work carried on in the four Industrial Schools of the Province:

VICTORIA INDUSTRIAL SCHOOL.

J. J. Kelso, Esq.,

Superintendent, Neglected and Dependent Children.

Sir,—I beg to present the following report of the Victoria Industrial School for the year ending December 31st, 1910:

School Population.

The number of boys in attendance on December 31st, 1909, was	245
The number of boys committed during the year was	164
The number returned as having broken the conditions of their parole	6
The number returned by the Courts	5
The number of escapes returned	3
Total number admitted	178
The number paroled, transferred, etc., was	134
The number in attendance on December 31st, 1910, was	289

Of those paroled, 60 were sent to other than their own homes. The average time spent in the school by those paroled was 18 months. Of the total number in the school, December 31st, 1910—

32 have been paroled and returned.
23 were paroled once.
6 were paroled twice.
2 were paroled three times.
1 was paroled five times.

These cover a period of ten years. Some of them have had poor home surroundings; others refused to remain in foster-homes on farms; while a few of them have physical and mental weaknesses, which will always be a handicap to them.

Of those who have been in continuous attendance—

159 have spent less than one year.
51 have spent less than one and a half years.
34 have spent less than two years.
12 have spent less than two and a half years.
1 has spent over three years.

Cause of Committal.

98 were committed for theft and burglary.
25 were committed for incorrigibility and truancy on complaint of parents.
23 were committed for incorrigibility and truancy on complaint of Children's Aid Societies.
9 were committed for vagrancy.
2 were committed for indecent assault.

2 were committed for false pretences.
2 were committed for arson.
1 was committed for drunkenness.
1 was committed for placing obstruction on railroad.
1 was committed for trespass.

Total 164

Whence Committed.

64 (or 39 per cent.) are from Toronto.
16 are from Hamilton.
10 " " London.
2 " " Ottawa.
4 " " St. Thomas.
6 " " Parry Sound.
3 " " Windsor.
3 " " Belleville.
3 " " Chatham.
2 " " Haileybury.
2 " " Sault Ste. Marie.
2 are from Niagara Falls.
2 " " Lennox and Addington
2 " " Simcoe Co.
5 " " Middlesex Co.
2 " " York Co.
4 " " Northumberland and Durham.
4 " " Grey County.
2 " " Frontenac Co.
2 " " Berlin.
2 " " Brant Co.
9 " " Ontario.

and 1 each from Guelph, Carleton Co. Peterborough, Dufferin, Leeds and Grenville, Welland, Oxford, Hastings, Essex, Lanark, Gravenhurst, Algoma, Stormont.

Education.

53 had little or no education.
54 ranked as Second Book pupils.
45 ranked as Third Book pupils.
12 ranked as Fourth Book pupils.

Age when Committed.

3	were	8	years	of age.	30	were	13	years	of age.
10	"	9	"	"	28	"	14	"	"
21	"	10	"	"	19	"	15	"	"
16	"	11	"	"	10	"	16	"	"
27	"	12	"	"					

Average age 12½ years.

I am pleased to report the continued good health of the school. We had seven cases of typhoid fever, all being treated in our school hospital, which is well-equipped and in charge of a trained nurse. The excellent health enjoyed by the boys as a whole is due in part to the excellent system now in operation, under the supervision of our painstaking physicians and the nurse. All new boys are kept in isolation until a bill of health is obtained from the Provincial Health Department. An analysis of the results during the past five years shows that fully 20% of the boys, when they come into the school have the bacilli of diphtheria. By isolating these we have been able to keep the school comparatively free from diphtheria. Regular hours for sleep, work and play; good, wholesome food; habits of cleanliness; well-kept, well-ventilated, lighted dormitories, living-rooms and school classrooms, all contribute to good health. The system of dental inspection carried on during the past ten years, under a careful, experienced dentist, whereby the teeth of all the boys are regularly attended to, is also an important factor in the general health of the boys.

The work of the boys in the various departments of industry has been very commendable; these are all under the direction of skilled workmen, and the training the boys receive is of a practical character. The half-day they spend in industrial pursuits has a greater educational value than the whole day spent in the school of letters. The half-day system, which makes provision for both the literary and industrial education of a boy, works out well, and in the end turns out a more thoroughly developed boy for the practical affairs of life.

We have opened another classroom and another teacher has been added to our teaching staff. We have now a staff of four teachers with seven classes of boys. This has made possible a more thorough classification, with fewer pupils to a teacher, and hence more opportunity for individual work. Our classes are still too large, however, for the best work, as a class of twenty-five is quite large enough for one teacher. From the foregoing tables it will be seen that 25% are almost wholly illiterate, while fully one-third are classified as Second Book pupils. Many of these boys are from 14 to 16 years of age, thus showing the need for small classes and painstaking teaching. Our teachers are much encouraged by the visits and kindly sympathy and co-operation of Mr. Elliott, Public School Inspector of the Board of Education of Toronto.

The most important work completed during the year was a change in our system of sewage disposal. Hitherto we had to take care of this on our own premises, and frequently very serious dangers to the health of the school resulted. The sewer system is now connected with that of New Toronto, immediatly south of the school. This is a permanent solution of this vexed problem. The total cost of the work was $5,000. Appended is a statement of receipts and expenditure for the year.

I have the honor to be,

Your obedient servant,

D. Ferrier,

Superintendent.

Receipts.

Municipalities	$17,516 58	
Government grants	25,503 48	
Boys' Band	65 61	
Boys' parents	35 50	
		$43,121 17

Expenditure.

Farm	$1,802 60	
Provisions	8,632 32	
Clothing	4,773 12	
Furnishings	1,083 73	
Household supplies	688 85	
Fuel and light	4,667 61	
Printing	207 77	
Repairs	2,340 74	
Salaries	10,415 91	
Insurance	530 00	
Interest	1,406 20	
Escapes	566 86	
Miscellaneous	2,060 68	
		$39,176 39

ST. JOHN'S INDUSTRIAL SCHOOL.

On January 1st, 1910, the number of boys at this school was 83, and on December 31st, 1910, the number was 76. The number committed to the school for the first time was 47, and 20 were returned, either from their own homes or from foster-homes where they had been placed. During the year 35 boys were apprenticed out, chiefly to farmers in Ontario, and 39 were returned to their own homes.

The months of May, July, September, and October were conspicuous for the increased number of committals; and February, April, and September for placements. The greatest number of pupils (83) was in the month of January, and the smallest (73) in June.

At considerable expense, connection was made between the school and the city water system, and now the school has an abundant supply of water for necessary uses, together with a hydrant and supply of hose pipe as a protection against fire. An incipient fire was discovered in one of the classrooms between ten and eleven oclock on the night of October 31st. One of the staff, who had fortunately been up, gave the alarm. With pails of water and a couple of fire-extinguishers the blaze was subdued. It was found that a considerable part of the floor was damaged and two desks burned. Both fire and smoke caused an expense of nearly $300, which was covered by insurance. The smoke having penetrated one of the dormitories where the boys slept, it was thought prudent to prepare them for outgoing. Luckily the precaution was unnecessary. The fire is supposed to have been caused by a defective gas burner in the basement beneath the classroom.

At the suggestion of His Grace, Archbishop McEvay, who has repeatedly given proofs of his deep interest in the welfare of the boys, a fully-equipped bakery has been added to the industries of the school. A competent foreman is in charge of the department, and all the bread now required for the household is baked there. Hitherto city bakers supplied bread at a cost of $90 per month. In the installation of the bakery, however, the bread bill was considered of secondary importance, the main purpose being to fit the boys for the baking trade.

The foregoing report shows that an earnest effort is being made to carry out the probation or parole system in connection with the Industrial Schools. Briefly stated, the law is that children committed to an Industrial School thereby become wards of the school until twenty-one years of age. They cannot be retained at the school more than three years, but need not necessarily be returned to their own homes, and when there is reason to believe that a boy has not been strengthened sufficiently to resist the influence of former bad companions and environment he is apprenticed out instead

of being returned to his home. In making up the figures recently of the boys who had been placed out in this way during a period of two years it was found that 50% of them had done well, 25% had done fairly well, and 25% had done badly.

The receipts and expenditure for the year ending 31st December, 1910, were as follows

Receipts.

Municipalities		$4,661 38
Government grant		7,525 25
Insurance Companies, re fire		244 65
Other sources		325 20
Home Bank, special loan		2,500 00
Interest on bank balances		22 10
		$15,278 58

Expenditure.

Overdraft, Home Bank, 1909		$759 72
Wages		2,154 58
House expense		6,724 93
Building		1,557 69
Land		2,500 00
Cash in bank	$1,869 16	
Less cheques O.S.	287 50	
		1,581 66
		$15,278 58

FRANCIS F. ROHLEDER.

Treasurer.

ALEXANDRA SCHOOL FOR GIRLS.

J. J. KELSO, Esq.,

Superintendent, Neglected and Dependent Children.

SIR,—I have the honor to report as follows for the Alexandra Industrial School, East Toronto, for the year ending December 31st, 1910:

The number in attendance, January 1st, 1911, was 90; the number admitted during the year, 40; the number who left the school, 43. Out of this number 2 were transferred to other institutions, 1 absconded and not accepted back, 40 were placed in situations or allowed to return to parents' homes. Among those who left us during the year 1 is attending a ladies' college, 2 attending a business college, 2 are in a business office, 1 comfortably married, 2 studying music in view of becoming music teachers, while 4 are continuing school studies. All things considered, results are gratifying. Of those in the school at present, 2 are waiting other situations, and 2 were sent back for further training.

Ages of girls when received: 2 were 17, 4 were 16, 10 were 15, 9 were 14, 10 were 13, 2 were 12, 2 were 11, 1 was 10. Average age, 14 years.

Whence committed: 16 were committed from Toronto, 3 each from Victoria County and Belleville, 2 from Lanark County; 1 from each of the following—Stratford, London, Berlin, Copper Cliff, Grey, Middlesex, Prince Edward, Northumberland, Welland, Norfolk, Oxford, Sarnia, Children's Aid Society.

The review of the year's work to a casual observer varies but little from preceding years, dealing with the same class of girl. But to the worker, every girl individually presents new phases. These girls for the most part are silly and ignorant, usually vulgar, self-willed or weak-willed, often very selfish and untruthful. They need to be steadied, taught, strengthened, made more sensitive and wakened up mentally, given the wish for imagination and conscience. So they are cared for, taught to care for themselves, and to work. The school protects them and teaches them how and why to protect themselves, and sees to it that when they leave they go to some protection better than they had before.

To enable them to forget the old, to gain new interests and rebuild themselves, their life here is made as busy as possible. They are trained in all domestic duties of a good home. They are taught dressmaking, plain sewing, laundry work, cooking, etc. They are trained in habits of cleanliness, neatness, and have presented to them at every turn the aspect and ideals of a healthy, useful, active, sensible home.

They attend the school of letters half a day. A great many of the girls are in the First Book on entering. It is gratifying to notice the interest shown and progress made. The Principal is to be congratulated in sustaining the high standard of the school. Three girls passed the entrance examination to the High School last June. A number are preparing this year. At the time of writing this, a letter was received from a girl who recently left the school, who in the short time while here had learned to read and write somewhat; and in this letter she expressed her thanks for what she had learnt, and proud to end her letter by saying, "I wrote this all myself."

Every pains is taken to give the girls all the fun and enjoyment they can stand; parties, concerts, picnics, games, etc., etc., are given. Their playground is furnished with swings, teeter-totters, etc. As no good results in play or work can be attained without a right foundation, so every advantage is given for their spiritual welfare—church, Sunday school, special Christian personal workers, daily Bible readings, etc.

Since the opening of the new building, the overcrowding has been relieved and each building is comfortably occupied. A better classification has been made. We have been enabled to do better work. What we sadly need now is a new school building, with a gymnasium and assembly hall. We trust this will be forthcoming in the near future.

The health of the girls has been good. With the pure, fresh, bracing air, good food and exercise, they invariably grow rapidly and become strong.

Thanking you for your continued interest and sympathy,

I have the honor to be, Sir,

Your obedient servant,

JOSEPHINE PARROTT.

ST. MARY'S INDUSTRIAL SCHOOL.

On December 31st, 1909, there were in residence at this school 19 girls. During the year 4 were discharged and 10 were admitted, thus leaving the number in residence, December 31st, 1910, at 25.

Of the ten children committed to the school in 1910, five were from Toronto and one each from Chapleau, Sudbury, Cobalt, London and Brockville.

Following is the report of the Superintendent:

The pupils in general give much satisfaction and require little punishment. Constant vigilance, of course, is necessary. Their course of instruction comprises:

(1) The complete course for Separate and Public School, from primary to senior fourth.

(2) Sewing, cutting, fitting, embroidery, hat trimming, lace making, mending.
(3) Household duties—cooking, sweeping, washing, ironing, cleanliness.
(4) Music—vocal, instrumental.
(5) Recreation and games, skating, and all innocent amusements.

As the report shows, a large percentage of the children committed during 1910 have bodies diseased. This is a regrettable condition of affairs, and makes our work infinitely harder, because once a girl, say 15 or 16, has gone as far as that, reformation from the heart out is almost impossible. They love their sins too well, not to return to them when free to do so. Until six years ago none were sent to us in that condition. The last two years few have been sentenced for any offence except the one of immorality.

The children who have left the school for the past six years, with the exception of one or two, are in communication with us either by writing or visiting. A number are married and have comfortable homes; others are earning a respectable livelihood, and three have lapsed and are leading questionable lives.

We trust you will find this satisfactory and remain,

Yours respectfully,

MOTHER MARY OF ST. PATRICK.

JUVENILE IMMIGRATION.

COLONIZING YOUNG BRITISHERS.

THERE was no material change in the agencies engaged in the work of bringing children to Ontario, and the number of children colonized is much the same as in the previous year. In 1909 there were 1,374 boys and 655 girls brought to this Province, while in 1910 the number of boys was 1,159 and girls 633. In 1909 children were credited to Ontario, but were placed in Quebec.

Owing to the retirement of the Ontario agent at Liverpool, Mr. P. Byrne, and the illness of his successor, Mr. N. B. Colcock, no report of the examinations in England has been received. This work is now so closely looked after by the Dominion Government that it is a question whether the Ontario inspection might not be dropped. Some of the societies complain of the vexation caused by the double inspection.

From the reports received from the Ontario Receiving Homes the following table has been compiled, showing the agencies and number of children received:

AGENCIES.	Boys.	Girls.	Total.
Dr. Barnardo's Homes	588	341	929
Catholic Emigration Association	103	22	125
The J. W. C. Fegan Home, Toronto	116	.....	116
The Macpherson Home, Stratford	136	91	227
The Marchmont Home, Belleville	56	21	77
The Church of England Society	.....	17	17
The Fairknowe Home, Brockville	100	92	192
The Salvation Army	10	.....	10
The Coombe, Hespeler	19	8	27
The Stephenson Home, Hamilton	104	6	110
Mrs. Birt's Home, Knowlton, Que	65	35	100
	1,297	633	1,930

ENLARGEMENT OF THE WORK.

There is a well-defined movement in Great Britain to greatly increase the number of children who are annually taken from the orphanages and rescue homes and sent to Canada. This movement recently received great impetus through the hearty endorsation of the Governor-General, who, in addressing an influential gathering in England, pointed out the advantages Canada offered and the many homes that were available for the reception of orphan children. Any enlargement of this class of work would have to be carefully thought out and an efficient and adequate business administration provided. It is all very well to say that there are homes available and that there are children to fill these homes, but children do not always stay settled. The child may not suit the people and, too, the people not infrequently are *non persona grata* to the child. Not only is one change frequently necessary in the course of six months, but often a child has to be moved about several times before it takes root. It is also true that some children never take root, and that when they become sixteen or seventeen

years of age they run away from their home and join the ranks of homeless wanderers, travelling about from place to place without restraint or guardianship, and constituting a class from which vagabonds and criminals are largely recruited. Canada has many such young people drifting about to-day, and letters received from time to time merely indicate how large the number must be in the aggregate.

If, therefore, any considerable enlargement of this class of work is undertaken, it should be with the understanding that a competent staff of inspectors will be provided to see that proper home treatment and schooling is given the children.

There is also some doubt as to the fairness of bringing out emigrant children under ten of twelve years of age, as there will always be Canadian children available to supply the bulk of the demand. Here is an item taken from the *Globe* of November last along this line:

"The transferring of orphan children from Great Britain to selected homes in this country is the next line of philanthropic activity that will be adopted by the Salvation Army, according to an announcement of Colonel Lamb, director of the immigration and colonization work of the Army from its London headquarters.

"The Colonel returned yesterday from a trip to Ottawa and Montreal in company with Commissioner Coombs and Colonel Mapp. At the capital they waited upon Earl Grey, who has ever shown sympathy with the endeavors of the Army to populate Canada, and who expressed hearty approval of their latest proposition.

"Colonel Lamb said to The *Globe* that negotiations were now being conducted with the Dominion authorities and the steamship companies in regard to the securing of their co-operation in this class of immigration, and that it was expected that special provision would be made by the steamship officials for the transference of children, and for their proper care while on the ocean.

"Children of five to twelve years of age would be brought across, said the Colonel, though the Army would concentrate its energies mainly on the removal of those of seven to nine years. Homes would be secured for them in advance, and the Army officers already had applications from persons who desired to adopt boys and girls. Country homes would be selected, and a constant supervision of these protegees would be maintained by the officers of the Army.

"The country districts, he found, were in need of help. As a rule the children of the farmers drifted away from home to the cities or to the west at an early age, and many agriculturists were desirous of adopting children who would prove of great help as they grew older. All the children brought over would be carefully selected, and those only of the best physique would be chosen."

HOPE IN THE NEW COUNTRY.

A recent article in the *Shaftesbury Magazine*, entitled "The New Philanthropy," graphically describes the motive underlying the immigration of English children to Canada. The following extract is taken from it:

"A prime cause of the wretched prospects which confront the children of the poor in England is purely economic, imposing no blame on anyone. It is a cause inherent in industrial conditions. Where people are employed in agriculture absolute hunger and want are rarely known. Though the earnings may be small, there is generally something in the garden for the table, or there is a pig in the sty, or chickens in the hen-coops, or some other natural product to fall back upon. But among wage-earners pure and simple, in the great cities, when a factory is closed, or some manufacturing concern suffers from bad trade and employees are thrown out of work, the wolf is not merely at the door, but across the threshold.

"All which makes the outlook of the poor man's son in this country more and more unpromising. Unable to enter the professions, or to bear the expense of apprenticeship, he is driven perforce into one of the many forms of casual labour, in which there is already fearful competition, and in which even in his best days the pay is meagre and uncertain.

"Moral causes in the wide sense, it must be admitted, are inextricably entwined with industrial and social causes, but from the broadly-human standpoint it is simply true to say that, through no grave fault of their own, thousands of England's boys and girls have 'no chance.'

"In striking contrast with this picture of the crowded ranks of industry at home, one hears continually of the favourable natural conditions and brilliant prospects offered by the Colonies. From Canada, Australia, New Zealand, South Africa, and elsewhere, comes the cry for young men, accompanied by the promise of a sure livelihood, attended with all the essential advantages of the Old Country, and a leisured and comfortable old age.

"To those who have personally investigated these claims and know their truth, it is infinitely pathetic to witness the toil and moil for the barest pittance—and a pittance uncertain at that—of thousands of lusty young fellows who, once settled across the seas, would, under suitable guidance and counsel, taste for the first time the real joy of life. To such, most of the talk about retaining England's youth for England savours of selfishness, if not of cant.

"Recognising these facts, certain philanthropic institutions have, for many years past, emigrated to the Colonies large numbers of orphans and others, of whom, even with the less careful selection and less stringent supervision of earlier days, an amazingly high proportion have turned out well. This policy, highly commended by competent judges, has earned the appropriate name of 'The New Philanthropy'; a philanthropy, that is to say, which, instead of patching up distress and applying plasters to our social sores, gives the victims thereof, on the sound principles of self-help, a new start in a new country. It is believed that there are many charitably-disposed persons who, once satisfied that this course is attended by the benefits claimed for it, would readily apply a portion of their wealth to providing young fellows of promise with an opportunity of carving their way to fortune in one of the British dependencies."

CHARGES OF CRUELTY.

There have been during the past year several widespread newspaper charges of cruelty to boys brought out from England, and while there was some ground for this in one case, in three others that were enquired into the farmers who were complained of were not to blame so much as the boys themselves. It was found that in one instance the lad was nineteen years of age, and was not either mentally or morally bright, with the result that he failed to take proper care of himself. In another case, where a boy had one of his feet frozen, it was shown that the lad failed to report the matter promptly, and that if he had mentioned it sooner the trouble might have been avoided. While we are constantly urging upon the agents of the various immigration societies to prosecute any apparent case of hardship or neglect, there is always present the temptation not to do so on account of the publicity given to these cases and the almost certain denunciation of farmers generally as a cruel and heartless lot. There are thousands of these boys in farm homes all over the Province, and they are, as a rule, receiving the best of treatment. To make a general charge against the farming community is unfair in the extreme, for if the homes in city and country could be averaged up it would be found that the great preponderance of kindly treatment and care would be found in the country.

English Children on Their Way to Ontario.

DR. BARNARDO'S HOMES.

The year's work of these institutions is summed up as follows by the Canadian agent, Mr. A. B. Owen:

With reference to the progress of our work during the past year, I beg to report that our institutions have placed out in Ontario 929 children, this total comprising 588 boys and 341 girls. In addition to this total 36 boys were placed out in Manitoba. We have found the demand for our boys and girls as large as ever, and we could have provided satisfactorily for fully ten times as many as we have placed during the past season it they had been available. The growth of the numbers under our charge has necessitated an increase in our staff of workers, both at the Toronto headquarters and at the Girls' Distributing Home at Peterborough. Our visiting staff now consists of five ladies and six gentlemen, all of whom spend their time uninterruptedly in visiting the children in their situations or foster-homes.

I am glad to be able to testify, as the result of another year's experience in the work, that cases in which children are subjected to neglect or ill-treatment of a serious character tend to become increasingly few and far between; on the contrary, it is only an insignificant percentage of those we place out who are not found to be happy and contented in their homes and to have every reason to be so. Doubtless this is to a large extent attributable to the close supervision which it is well known is maintained over the children placed out; but, apart from this, we find that the public sentiment is keenly alive to anything like ill-treatment of children and, in fact, the tendency is to exaggerate, sometimes to an absurd extent, even the most minor charges of neglect, and to visit upon employers or foster-parents ailments or misfortunes for which they are in no way responsible, or in respect to which they have erred only through ignorance or misjudgment.

We cordially welcome the disposition to enforce with greater strictness the Statutes requiring the attendance at school of children under age, and we are always ready and willing to co-operate with the local authorities in securing for those children for whom we are responsible all the educational privileges to which they are legally entitled.

The health of the young people under our charge has been very satisfactory during the past year, but in view of the great number of those now under our care, it has been thought advisable to engage the services of a medical inspector, whose time shall be exclusively devoted to visiting and attending upon any amongst our boys and girls who are sick and ailing, or who seem to require a doctor's attention. The results have fully justified the policy of making the appointment.

MR. FEGAN'S HOMES.

Mr. George Greenway reports that one party arrived on April 16th, 1910, numbering 96, and about 20 young men, all of whom went out on to farms. Places were awaiting all of them on their arrival.

To Prepare Boys for Ontario.

It is interesting to note that Mr. J. W. C. Fegan, Director of the Fegan Boys' Homes in England and Toronto, has issued a circular letter outlining a plan for preparing boys to succeed on farms in Ontario, and money is now being raised in England to launch it. It consists of a Training Farm to be established in England upon which would be erected a plain building, providing sleeping accommodation, classrooms, etc., for, say 60 boys, capable of easy enlargement as desired, where the boys can get a glimpse of country life and an insight into some of the farm work which falls to a hired lad's lot the first few months he is in Canada—stable work, cow keeping, vegetable and fruit

growing, the rearing of poultry and pigs, beekeeping, etc.; and by spade husbandry and physical drill put him in as hard condition as can be for the labor before him in the busy spring and summer time on a Canadian homestead.

A unique feature of the proposal is that one or two houses will be built for overseer, instructor, etc., which will be an exact reproduction of a moderate farmhouse in Canada, with stable, barn and outbuilding exactly as in Ontario; also all implements, tools, harness, etc., that will be useful, to be imported from Ontario, and those for which there might be found no use to be kept on exhibition and explained and their uses shown to the lads by means of diagrams, lantern slides, etc.

The farmhouse or farmhouses will be furnished, fitted with heating furnace, cooking stove, and the meals will be served as nearly as possible like they are in an Ontario homestead, and in batches of say three or four the lads will all by turn spend a fortnight in one of these farmhouses, just as they will live with the "boss" and his family in Canada, and learn Canadian manners and customs, and how to be helpful in the house and out of it, by doing those little services for the busy housewife, etc., which are called "chores." At anyrate the lads would be sent out with the best physical development that could be given them during the time they are under the care of the directors, well fed on plain country fare and fresh country air, etc.; "hard as nails" in condition, and familiar by practice with farm routine, indoor and outdoor, and as much of the work, implements, etc., as possible, and at least with some theoretical knowledge of other operations, and knowing from lecture, model and picture the name and appearance of crops, stock, buildings, fencings, etc., which could not be actually made use of on the English farm.

An important part of the proposal is that the overseer and instructor must have had actual farming experience in Ontario; and if they are "old boys" who were sent out under Mr Fegan's direction years ago and have proved that they can successfully manage a farm in Ontario, all the better; and two such men, Mr. Fegan feels sure, he can find from the "old boys," ready and able to undertake this part of the work.

THE ANNIE MACPHERSON HOME, STRATFORD.

This institution has received from England during the year two large parties of young people. Mr. W. H. Merry reports:

Our first party arrived about the middle of May, coming on the Allan Liner *Tunisian*, being composed of 86 boys and 31 girls, making a party of 117 in all.

In July, by the Allan Line steamer *Virginian*, we received our second company, which was composed of 60 girls and 50 boys; total of party, 110.

So that we have received in all 227, the ages of whom averaged about 12 years and 1 month.

They are all placed in homes, with but two exceptions, and they are, we believe, in good homes, to judge from our visitors' reports and from the letters we receive from them, only two whom we have from this year's arrivals being returned to us for minor ailments.

Our work has been satisfactory during the year, no serious cases of sickness, and comparatively little trouble. During the year we have returned to England four children, one for bad conduct and three for treatment.

Our staff remains much the same as last year, only two minor changes.

During the year we have recorded 407 applications for girls and 391 for boys, the only falling off in our applications being for the very small boys.

We beg leave to gratefully acknowledge the kindly aid of several of the agents of the Children's Aid Society through this part of the Province, in dealng with our young folks living at a distance from us.

MARCHMONT HOME, BELLEVILLE.

Mr. Wallace reports that the demand for boys and girls is as great as ever, and, during the past year, the Home received from England 56 boys and 21 girls, all of whom were readily placed in foster-homes.

Visitation has been carried on during the summer and fall, and the reports sent in by visitors have, on the whole, been very satisfactory.

WAIFS' AND STRAYS' SOCIETY.

The Church of England Society for Providing Homes for Waifs and Strays maintains a distributing Home at Niagara-on-the-Lake The following is the report of work carried on:

The Official Visitor begs to report in regard to visits paid, number of girls received during the year, etc., as follows: I have visited, during the summer of 1910, about 100 girls, having travelled 2,000 miles. The great majority of these are doing well and giving satisfaction; a few, of course, not so well, and only two very badly. We have received during the year just ended, only 38 girls, the majority of whom came from the Emigration Home of the Waifs' and Strays' Society at Peckham, London, England. Nearly all of these have been placed out; the younger ones are not to be placed, but kept in the Home and go regularly to the Home School until they are twelve or fourteen years of age.

I have found the girls in good homes, and have noticed with much pleasure that the mistresses are kind and patient, bestowing much personal attention and giving careful and kind training.

Miss Bayley is Superintendent and Mrs. S. D. Manning, Visitor.

THE QUARRIER HOME, BROCKVILLE.

This Home, which is connected with the Quarrier Orphan Homes, Bridge of Weir, Scotland, received during the year 100 boys and 92 girls.

Sixty of these girls were from 8 to 12 years of age; the other 32 being from 12 to 22.

488 applications were received at the office for the 100 boys, and 542 families wanted the 92 girls for adoption.

Twenty-one marriages have been reported—the girls mostly to industrious, well-to-do farmers.

Pastor and Mrs. Findlay, together with the resident agent, Mr. Grierson, and his assistants, have made 800 visits during the year.

Also, by means of a personal letter, monthly or bi-monthly, and a special one at the New Year, all the children are watched over and encouraged to persevere in their endeavors to make a complete success of their lives. None have been returned home because of any failure this year; but excellent reports have been received concerning the progress made, much to the encouragement of all the workers.

NATIONAL CHILDREN'S HOME.

The National Children's Home and Orphanage of England maintains a distributing centre at Hamilton, under the direction of Mr. Frank Hills. He reports as follows:—

The total number of children received, 110—Boys, 104; girls, 6. Ages being from 12 to 18 years. Our children are visited at least once a year, and our reports are very

gratifying. The health of the children is excellent and we have had no serious trouble with boys or employers. The conditions of the country show great prosperity, which is shared by our boys receiving increased wages for their labor and employers making a prompt settlement with us under their yearly contracts. There has been a constant increase in applications for help on farms and hundreds have had to be disappointed.

Some of our old boys have gone West and taken up homesteads, while many others have greatly improved their positions in other directions.

THE COOMBE, HESPELER.

The Smyly Homes for Children, in Dublin, Ireland, maintains The Coombe at Hespeler, and during the past year 19 boys and 8 girls have been received from Dublin. There are now 150 boys and girls on the books and about 100 others who are beyond the age limit for the responsible oversight of the Home officials, who are are doing well in their situations. Some 150 visits have been made to various parts of Ontario in order to enquire into the surroundings under which the children are living, and almost without exception they have been found satisfactory.

Many of the boys and girls have visited the Home during the year, and their regard for the welfare of others has been shown by their money gifts toward the expenses of bringing out more boys and girls from Dublin.

The condition of the Home has been considerably improved by alterations and repairs, also the garden space has been enlarged and additional fruit trees, etc., planted, the boys being well engaged during the season in out-door employment.

Mr. and Mrs. Geo. W. Tebbs, the Superintendents, express their thanks to many friends who have assisted the work.

CATHOLIC EMIGRATION ASSOCIATION.

During the past year there were received from England at St. George's Home, 1152 Wellington St., Ottawa, 270 boys and 63 girls, a total of 333. Of this number, 103 were provided with homes in this Province and 151 in Quebec. Many applications were received that could not be filled. The Sisters of Charity of St. Paul continue in charge of the work, the staff consisting of Mother Superior Evangelist O'Keefe and five sisters. The visiting is done by the Sisters and Mr. Edwin J. Collingwood. During the summer a visit was received from His Grace Archbishop Bourne of Westminster and His Lordship the Bishop of Birmingham; also, the Secretary and two members of the Association.

MRS. BIRT'S HOME, KNOWLTON, QUEBEC.

About one hundred children from the Sheltering Army, Liverpool, were provided with foster-homes in Ontario from Mrs. Birt's receiving agency at Knowlton, Quebec. These were placed out and visited by Mr. Drummond.

SALVATION ARMY.

Only a few boys were brought over by the Salvation Army during the year. There are, however, about eighty boys between 15 and 18 who are under the supervision of the Army officials in this Province.

EDITORIAL COMMENTS.

The following editorial, bearing upon juvenile emigration, is taken from the *Toronto Globe*:—

"In view of the statement made by the Salvation Army that they propose to go extensively into the work of bringing English orphan children from five to nine years of age to this country, it is interesting to review what is being done for our native-born children. As is well known, Mr. J. J. Kelso has for many years advocated the home-finding plan, where children are left without proper parentage, and so far as the Children's Aid Societies are concerned, they have done excellent work, having sent to foster-homes over six thousand children in the past fifteen years. However, there is a large number of children in orphanages who ought to come under this system of home-finding. The statistics furnished by the Ontario Government blue book state that during 1908 there were 4,718 children cared for in the orphanages, with an actual resident population of 2,168 on September 30th, 1908. The cost of maintenance for that year is given at $157,592. Commenting on these figures, Mr. Kelso says in his last report:—

"'The orphanage population in Ontario and the cost for their maintenance could be reduced to one-half if a determined effort were made to force parents who were able to do so to maintain their own children and place in foster-homes those children whose own homes are so bad that they cannot with safety to the community be returned to their parents. While a reduction in the number of children now in the orphanages would reduce the cost to the charitable public, it would be of infinitely more value to the community and to the children themselves by giving them the ordinary surroundings of home life and better fitting them for contact with the world when the time came for them to be thrown upon their own resources and showing of what material they are made.'

"As over half of the orphan children of the Province are located in Toronto and supported by the citizens, it would be good policy for the Board of Control to appoint someone to make a study of this question and see if some reform could not be brought about."

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REPORT

ON THE OPERATION OF THE

Liquor License Acts, Ontario

FOR THE YEAR

1910

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
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1911.

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TORONTO

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REPORT

ON THE OPERATION OF THE

LIQUOR LICENSE ACTS, ONTARIO

FOR THE YEAR 1910

PROVINCIAL SECRETARY'S OFFICE,

LICENSE BRANCH,

TORONTO, 2nd JANUARY, 1911.

To the Honourable JOHN MORISON GIBSON, K.C., LL.D.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the honour to submit the Thirty-fifth Annual Report and accompanying Schedules, respecting the operation of the Liquor License Laws of the Province.

The total number of Tavern and Shop Licenses for the License Year, ending the 30th of April, 1910, has been reduced by 145, as compared with the previous year, and for the current License Year 1910-11 up to date there have been issued only 1,617 tavern and 225 shop licenses, which represent a further reduction of 144.

Schedule "A" is a statement of the number of licenses issued in the several counties and cities during the past thirty-five years.

Schedule "B" gives in detail the amounts received for licenses from each city, town, incorporated village and township and unorganized territory of the Province, the number of licenses, extensions and transfers granted, and the amounts divided between the Municipalities and the Province.

The licenses issued during the past five years are as follows:—

Years.	Licenses.								Extensions and transfers of licenses.		
	Tavern.				Shop.	Wholesale.	Club.	Total.	Extensions.	Transfers.	Total.
	Yearly.		Six months.								
	Ordinary.	Beer and wine.	Ordinary.	Beer and wine.							
1905-6.....	2,366	18	51	3	283	24	.....	2,745	144	751	895
1906-7.....	2,197	10	47	3	267	23	24	2,571	54	281	335
1907-8.....	2,102	8	43	3	265	25	35	2,481	52	420	472
1908-9.....	2,002	8	18	3	253	23	42	2,379	39	319	358
1909-10.....	1,866	7	40	3	245	33	50	2,244	43	315	358

Municipal Revenue.

The total amount paid to the Municipalities for the license year 1909-10, as shown by this Schedule, was $399,167.65.

The revenue received by the Province for the license year from retail licenses, transfers and fines amounted to $497,776.79.

Schedule "C."

The fines collected during the past year, as shown by this schedule, amount to $55,135.75, and in the Local Option municipalities, as shown in Schedule "K," the amount collected was $8,313.

Schedule "D."

The cost of commissioners and local inspectors for operating and enforcing the Act in the several districts is given in this Schedule.

The provincial inspectors, with the assistance of special officers, have energetically enforced the License Act.

The expenditure for this service for the year 1909-10 amounted to $26,288.26.

During the ten months ended 31st October, 1910, members of the Ontario Provincial Police Force have initiated, or assisted officers of the Liquor License Department in, 252 prosecutions under the Liquor License Act. In 213 cases convictions were obtained, 36 persons were discharged, two cases were withdrawn, one is awaiting trial, and 2 remain to be dealt with.

The fines imposed, in addition to sentences of imprisonment in a number of cases, amounted to $12,934.

During the ten months members of the Ontario Provincial Police Force seized 5,915 bottles of whiskey, 108 gallons, 216 flasks, 18 barrels, also one barrel of stout, two gallons of gin, 224 bottles of wine, and 66 gallons of high wines.

Commitments for Drunkenness.

Schedule "F" shows the number of Prisoners committed for drunkenness during the years from 1876 to 1910 inclusive. The number committed during the year 1910 as compared with 1909 shows an increase of 304.

The average yearly commitments for each period of five years from 1876 to 1910 inclusive are as follows:

From	1876 to 1880	inclusive	3,812
	1881 to 1885	"	4,016
	1886 to 1890	"	3,311
	1891 to 1895	"	2,703
	1896 to 1900	"	1,920
	1901 to 1905	"	3,186
	1906 to 1910	"	4,974

Respectfully submitted.

W. J. HANNA,

Provincial Secretary.

SCHEDULES.

SCHEDULE A.

COMPARATIVE STATEMENT BY COUNTIES AND CITIES, showing the number of (Provincial) Tavern, Shop, Wholesale and Vessel Licenses issued in the several Counties of the Province, and the Cities separated from Counties, for the license years 1874-5-6-7-8-9-80-1-2-3-4-5-6-7-8-9-90-1-2-3-4-5-6-7-8-9-1900-1-2-3-4-5-6-7-8-9.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses. ***	Vessel licenses.	Remarks.
Algoma (including Kenora, Rainy River, Fort William, Port Arthur, Algoma, Sault Ste. Marie, Manitoulin and Sudbury)	1874	30	14	.....	3	
	1875	36	15	.....	3	
	1876	18	6			
	1877	19	5			
	1878	19	5			
	1879	21	8	1		
	1880	22	6	1		
	1881	29	9	1		
	1882	35	9	1		
	1883	56	6	1		
	1884	74	12	2		
	1885	58	12	1		
	1886	62	16	1		
	1887	78	11	2		
	1888	83	16	1		
	1889	90	17			
	1890	94	15			
	1891	94	11			
	1892	92	11			
	1893	95	13			
	1894	93	12			
	1895	96	13	1		
	1896	99	13			
	1897	108	15			
	1898	111	14	.....	Club Licenses	
	1899	120	14			
	1900	118	13			
	1901	116	14	1		
	1902	131	15	1		
	1903	130	15	1		
	1904	140	16	1		
	1905	130	13			
	1906	123	11	.....	1	
	1907	120	11	.....	2	
	†1908	130	12	.....	3	
	1909	135	13	.....	4	

*** For Wholesale Licenses after 1905 see Schedule of Wholesale Licenses.

† Apparent increase is caused by re-arrangement of districts, decrease of same number in Nipissing.

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Brant (not including City of Brantford).	1874	95	29			
	1875	73	22	2		
	1876	56	14	4		
	1877	.....	.....	7	.....	Dunkin Act in force.
	1878	53	11	5		
	1879	55	14	1		
	1880	57	14	1		
	1881	55	14	1		
	1882	59	13	1		
	1883	58	11	1		
	1884	49	7			
	1885	44	7	1		
	1886	.....	.....	.....	.....	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	26	2			
	1890	26	2			
	1891	22	2			
	1892	23	2			
	1893	23	1			
	1894	22	1			
	1895	18	1			
	1896	18	1			
	1897	18	1			
	1898	18	1			
	1899	18	1			
	1900	17	1			
	1901	18	1			
	1902	18	1			
	1903	17	1			
	1904	17	1			
	1905	18	1			
	1906	18	1			
	1907	16	1			
	1908	16	1			
	1909	16	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Bruce	1874	180	25			
	1875	119	22			
	1876	88	13	3		
	1877	83	12	2		
	1878	83	9	2		Dunkin Act in force for 10 months.
	1879	93	12			
	1880	98	14			
	1881	105	15			
	1882	109	18			
	1883	108	16			
	1884	99	15			
	1885					C. T. A. in force.
	1886					" "
	1887					" "
	1888	97	6			
	1889	102	6			
	1890	98	6			
	1891	97	6			
	1892	96	5			
	1893	97	5			
	1894	90	5			
	1895	90	5			
	1896	88	4			
	1897	87	4			
	1898	83	4			
	1899	81	4			
	1900	82	4			
	1901	81	4			
	1902	80	4			
	1903	80	4	1		
	1904	77	3	1		
	1905	74	3			
	1906	62	2			
	1907	55	2			
	1908	55	2			
	1909	56	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Carleton (not including Ottawa).	1874	89	5			
	1875	79	8			
	1876	44	1	2		
	1877	55	3			
	1878	43	3			
	1879	43	1			
	1880	42	3			
	1881	50	3			
	1882	54	1			
	1883	58				
	1884	58	1			
	1885	55				
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	44	1			
	1890	44	1			
	1891	45				
	1892	46				
	1893	44				
	1894	45				
	1895	45				
	1896	44				
	1897	44				
	1898	46				
	1899	44				
	1900	44				
	1901	43				
	1902	43				
	1903	42				
	1904	42				
	1905	36				
	1906	27			Club	
	1907	25				
	1908	12				
	1909	10			1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Dufferin	1881	33	7	.....	.....	New County, erected 24th January, 1881.
	1882	33	5			
	1883	34	5			
	1884	34	4			
	1885	.....	.....	.....	.....	C.T.A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	24	2			
	1889	27	2			
	1890	26	2			
	1891	24	2			
	1892	24	2			
	1893	21	2			
	1894	21	2			
	1895	19	2			
	1896	19	2			
	1897	18	2			
	1898	15	2			
	1899	18	1			
	1900	18	1			
	1901	18	1			
	1902	17	1			
	1903	17	1			
	1904	17	1			
	1905	17	1			
	1906	15	1			
	1907	13	1			
	1908	12	1			
	1909	12	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Elgin	1874	113	25			
	1875	110	24			
	1876	66	16			
	1877	66	10			
	1878	69	12			
	1879	72	16			
	1880	74	12			
	1881	74	13			
	1882	74	13			
	1883	74	16			
	1884	74	12			
	1885	71	10			
	1886					C.T.A. in force.
	1887					" "
	1888					" "
Not including St. Thomas	1889	48	2			
" "	1890	44	1			
" "	1891	43	1			
" "	1892	44	1			
" "	1893	42	1			
" "	1894	41	1			
" "	1895	41	1			
" "	1896	39	1			
" "	1897	36	1			
" "	1898	35	1			
" "	1899	36	1			
" "	1900	36	1			
" "	1901	35	1			
" "	1902	36				
" "	1903	36				
" "	1904	36				
" "	1905	29				
" "	1906	23				
" "	1907	23				
" "	1908	23				
" "	1909	23				

SCHEDULE A.—Comparative statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Essex	1874	120	28	6		
	1875	101	25	6		
	1876	62	14	5	1	
	1877	69	18	1	1	
	1878	69	18	2	1	
	1879	71	18	3	1	
	1880	70	19	2	1	
	1881	74	21	2		
	1882	71	20	2		
	1883	74	19	2		
	1884	70	15	1		
	1885	77	13			
	1886	74	16			
	1887	84	15			
	1888	82	10			
	1889	95	12			
	1890	94	8			
Not including Windsor.....	1891	68	5			
" "	1892	71	5			
" "	1893	73	5			
" "	1894	70	6			
" "	1895	75	6			
" "	1896	72	6			
" "	1897	73	6			
" "	1898	72	6			
" "	1899	76	5	1		
" "	1900	83	5	1		
" "	1901	81	6	1		
" "	1902	84	6	1		
" "	1903	84	7	1		
" "	1904	84	8	1		
" " ...	1905	84	6			
" "	1906	80	6			
" "	1907	80	6			
" "	1908	76	7			
" "	1909	66	7			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Frontenac (not including Kingston)	1874	71	2			
	1875	57	29			
	1876	29	.....	4		
	1877	17	.....	.....	.....	Dunkin Act assumed to be in force until quashed, December 28.
	1878	34				
	1879	36				
	1880	33	1			
	1881	33	1			
	1882	33	2			
	1883	36	2			
	1884	34	2			
	1885	34	1			
	1886	.....	.....	....	....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	23				
	1890	25				
	1891	23				
	1892	24				
	1893	22				
	1894	22				
	1895	24				
	1896	21				
	1897	33				
	1898	21				
	1899	22				
	1900	23				
	1901	23				
	1902	22				
	1903	22				
	1904	21				
	1905	21				
	1906	13				
	1907	10				
	1908	7				
	1909	7				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Grey	1874	115	20	.....	3	
	1875	114	16	.....	2	
	1876	77	11	5	2	
	1877	.....	.....	6	2	Dunkin Act in force
	1878	72	7	4	1	Dunkin Act in force until September.
	1879	91	12	1	1	Melancthon and Shelburne attached to new County of Dufferin.
	1880	88	17	1	2	
	1881	84	16	.....	1	
	1882	88	18	.....	1	
	1883	95	20	.....	3	
	1884	91	19	.....	1	
	1885	92	18			
	1886	92	16	.....	3	
	1887	86	14	.....	3	
	1888	84	7	.....	4	
	1889	84	6	.....	1	
	1890	81	6			
	1891	75	5			
	1892	76	5			
	1893	77	5			
	1894	76	5			
	1895	76	5			
	1896	73	5			
	1897	72	3			
	1898	69	2			
	1899	66	2			
	1900	68	3			
	1901	68	2			
	1902	68	2			
	1903	67	2			
	1904	65	2			
	1905	62	2			
	1906	35				
	1907	31				
	1908	27				
	1909	26				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Haldimand	1874	96	16			
	1875	83	13			
	1876	45	5			
	1877	49	4			
	1878	49	4			
	1879	50	5			
	1880	47	5			
	1881	51	5			
	1882	52	5			
	1883	51	5			
	1884	47	5			
	1885	47	3			
	1886	48	4			
	1887	49	4			
	1888	43	4			
	1889	45	3			
	1890	49	3			
	1891	47	3			
	1892	47	3			
	1893	44	3			
	1894	42	3			
	1895	42	3			
	1896	42	4			
	1897	37	4			
	1898	36	4			
	1899	35	4			
	1900	35	4			
	1901	33	4			
	1902	32	4			
	1903	32	3			
	1904	32	3			
	1905	31	3			
	1906	30	3			
	1907	28	3			
	1908	27	2			
	1909	24	1			
Haliburton	1886	7				
	1887	6				
	1888	6				
	1889	7				
	1890	7				
	1891	8				
	1892	8				
	1893	8				
	1894	10				
	1895	8				
	1896	8				
	1897	7				
	1898	6				
	1899	6				
	1900	7				
	1901	7				
	1902	7				
	1903	7				
	1904	7				
	1905	6				
	1906	6				
	1907	6				
	1908	6				
	1909	6				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Halton	1874	61	4			
	1875	58	5			
	1876	39	2	1		
	1877	38	1			
	1878	38	1			
	1879	42	1			
	1880	41	1			
	1881	41	1			
	1882	....	.....	.....	.....	C.T.A. in force.
	1883	.....	.....	.....	.....	" "
	1884	.....	.....	.....	.....	" "
	1885	.....	.....	.....	.....	" "
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	28				
	1889	28				
	1890	27				
	1891	27				
	1892	26				
	1893	27				
	1894	28				
	1895	28				
	1896	26				
	1897	23				
	1898	22				
	1899	22				
	1900	23				
	1901	21				
	1902	22				
	1903	20				
	1904	20				
	1905	19				
	1906	15				
	1907	17				
	1908	17				
	1909	16				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses	Vessel licenses.	Remarks.
Hastings	1874	117	23	1		
	1875	100	21	2		
	1876	76	11	3	1	
	1877	82	14	3	1	
	1878	89	15	3	2	
	1879	94	15	3	1	
	1880	91	16	3		
	1881	90	15	3		
	1882	95	13	3		
	1883	97	15	3		
	1884	90	14	3		
	1885	98	17	3		
	1886	104	16	2		
	1887	102	13	2		
	1888	96	13	3		
Not including Belleville	1889	73	9			
" "	1890	74	8			
" "	1891	74	8			
" "	1892	72	7			
" "	1893	70	7			
" "	1894	67	7			
" "	1895	68	8			
" "	1896	66	6			
" "	1897	67	7			
" "	1898	59	7			
" "	1899	57	8			
" "	1900	55	8			
" "	1901	56	9			
" "	1902	56	9			
" "	1903	55	9			
" "	1904	53	8			
" "	1905	49	7			
" "	1906	49	7			
" "	1907	46	7			
" "	1908	43	5			
" "	2909	31	4			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Huron.....	1874	150	38			
	1875	164	37	2		
	1876	113	16	3		
	1877	124	16			
	1878	127	20			
	1879	134	21			
	1880	131	16			
	1881	128	15			
	1882	124	15			
	1883	124	15			
	1884	111	14			
	1885	.....	.....	.....	....	C.T.A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	108	11			
	1889	109	8			
	1890	103	5			
	1891	104	5			
	1892	102	5	1		
	1893	94	5	1		
	1894	92	5	1		
	1895	90	5	1		
	1896	88	6			
	1897	85	6			
	1898	83	6			
	1899	84	6			
	1900	82	6			
	1901	80	6			
	1902	79	6			
	1903	77	6			
	1904	76	5			
	1905	73	5			
	1906	72	5			
	1907	64	4			
	1908	62	4			
	1909	56	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Kent	1874	128	41	.....	1	
	1875	118	34	.....	1	
	1876	66	13	4	1	
	1877	67	15	.....	1	
	1878	65	13			
	1879	67	14			
	1880	67	13			
	1881	69	13	.....	1	
	1882	69	14	.....	1	
	1883	70	14			
	1884	75	11			
	1885	71	8			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	72	6			
	1890	75	6			
	1891	63	5			
	1892	61	4			
	1893	61	4			
	1894	61	4			
Not including Chatham	1895	44	2			
" "	1896	46	2			
" "	1897	43	3			
" "	1898	42	3			
" "	1899	42	3			
" " .	1900	41	3			
" "	1901	41	3			
" "	1902	43	3			
" "	1903	41	3			
" "	1904	28	3			
" "	1905	27	3			
" "	1906	28	3			
" "	1907	29	3			
" "	1908	31	3			
" "	1909	31	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lambton	1874	89	44	1		
	1875	85	33			
	1876	65	28	1		
	1877	65	25			
	1878	70	27			
	1879	72	26			
	1880	71	25			
	1881	72	22			
	1882	75	22			
	1883	73	19			
	1884	74	16	1		
	1885	70	10	1		
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	65	9			
	1890	70	10			
	1891	64	6			
	1892	62	5			
	1893	64	5			
	1894	63	5			
	1895	61	5			
	1896	62	5			
	1897	62	4			
	1898	58	4			
	1899	58	4			
	1900	58	4			
	1901	59	4			
	1902	60	4			
	1903	61	4			
	1904	60	4			
	1905	58	3			
	1906	43	3			
	1907	42	3			
	1908	41	3			
	1909	39	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lanark.....	1874	62	20	2		
	1875	62	20	1		
	1876	32	9	2		
	1877	32	9			
	1878	7	4	.....	.....	Dunkin Act in force, except in Perth.
	1879	33	6			
	1880	34	8			
	1881	36	6			
	1882	36	7			
	1883	35	7			
	1884	36	7			
	1885	37	6			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	39	6			
	1890	45	7			
	1891	44	6			
	1892	44	7			
	1893	44	7			
	1894	44	6			
	1895	44	6			
	1896	44	6			
	1897	43	6			
	1898	43	6			
	1899	43	6			
	1900	44	6			
	1901	44	6			
	1902	45	6			
	1903	43	6			
	1904	42	6			
	1905	40	6			
	1906	37	3			
	1907	35	3			
	1908	35	3			
	1909	32	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Leeds and Grenville..... ...	1874	145	32	1		
	1875	136	23	1		
	1876	79	23	3		
	1877	101	25			
	1878	97	19			
	1879	97	18			
	1880	97	20	1		
	1881	89	18			
	1882	92	21			
	1883	94	21			
	1884	88	17			
	1885	77	17			
	1886	.....	.....	....	.....	C.T.A. in force.
	1887	....	.....	.....	.....	" "
	1888	.....	.....	..... .	.....	" "
	1889	73	13			
	1890	70	10			
	1891	69	10			
	1892	66	8			
	1893	67	7			
	1894	64	7			
	1895	65	7			
	1896	61	7			
	1897	57	7			
	1898	57	7	1		
	1899	58	8			
	1900	56	8			
	1901	58	8	.....	Clubs	
	1902	55	8			
	1903	57	8			
	1904	56	8			
	1905	36	6			
	1906	48	8	.....	1	
	1907	46	6	.....	1	
	1908	47	4	.....	2	
	1909	40	4	.....	2	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lennox and Addington	1874	52	7	.....	1	
	1875	46	8			
	1876	28	6	1		
	1877	.. ..	.....	1	.....	Dunkin Act in force.
	1878	36	6			
	1879	37	5			
	1880	37	5			
	1881	41	5			
	1882	43	6			
	1883	45	6			
	1884	44	5			
	1885	42	5			
	1886	.....	.... ..	.....	.. ..	C.T.A. in force.
	1887	.....	..... .	.....	....	" "
	1888	.....	.....	.....	.....	" "
	1889	52	3			
	1890	49	2			
	1891	46	2			
	1892	47	2			
	1893	47	2			
	1894	44	1			
	1895	40	1			
	1896	37	1			
	1897	39	1			
	1898	37	1			
	1899	36	1			
	1900	35	1			
	1901	31	2			
	1902	34	2			
	1903	34	2			
	1904	34	2			
	1905	33	2			
	1906	33	2			
	1907	31	2			
	1908	31	2			
	1909	31	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Lincoln (not including St. Catharines).	1874	94	23			
	1875	103	37			
	1876	70	31			
	1877	70	25			
	1878	69	21			
	1879	72	16			
	1880	73	12			
	1881	69	14			
	1882	73	15			
	1883	72	13			
	1884	71	11			
	1885	64	10			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	36	3			
	1890	36	3			
	1891	35	3			
	1892	34	1			
	1893	29	1			
	1894	28	1			
	1895	28	1			
	1896	27	1			
	1897	27	1			
	1898	27	1			
	1899	26	1			
	1900	26	1			
	1901	26	1			
	1902	26	1			
	1903	25	1			
	1904	21	1			
	1905	21	1			
	1906	13	1			
	1907	11	1			
	1908	11	1			
	1909	11	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Middlesex (not including London).	1874	188	17	1		
	1875	174	33			
	1876	122	26	3		
	1877	139	23			
	1878	143	21			
	1879	141	19			
	1880	134	18			
	1881	138	18			
	1882	133	16			
	1883	130	18			
	1884	126	17			
	1885	128	16	.....	1	
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	82	8			
	1890	93	6			
	1891	93	5			
	1892	90	5			
	1893	80	4			
	1894	73	4			
	1895	69	4			
	1896	68	4			
	1897	67	4			
	1898	65	4			
	1899	67	4			
	1900	68	4			
	1901	67	4			
	1902	66	4			
	1903	63	2			
	1904	60	2			
	1905	56	1			
	1906	55				
	1907	49				
	1908	50				
	1909	44				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Muskoka and Parry Sound..	1874	9				
	1875	23				
	1876	19				
	1877	22				
	1878	29				
	1879	38	1			
	1880	44	4			
	1881	45	4			
	1882	48	5			
	1883	49	6			
	1884	48	4			
	1885	37	1			
	1886	23				
	1887	21				
	1888	32	1			
	1889	45	2			
	1890	47	1			
	1891	47	1			
	1892	53	1			
	1893	50	2			
	1894	56	2			
	1895	60	1			
	1896	60	1			
	1897	59	1			
	1898	58	1			
	1899	57	1			
	1900	59	1			
	1901	56	1			
	1902	58	1			
	1903	55	1			
	1904	52	1			
	1905	53	2			
	1906	53	2			
	1907	50	2			
	1908	45	2			
	1909	44	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Nipissing (including Temiskaming and Sturgeon Falls).	1878	2	1			
	1879	3	1			
	1880	3	1			
	1881	11	8			
	1882	8	5			
	1883	9	5			
	1884	5	5			
	1885	23	6			
	1886	22	4			
	1887	24	5			
	1888	23	4			
	1889	23	4			
	1890	27	4			
	1891	26	5			
	1892	30	6			
	1893	30	6			
	1894	28	5			
	1895	31	6			
	1896	34	6			
	1897	36	6			
	1898	34	5			
	1899	32	5			
	1900	34	5			
	1901	37	5			
	1902	39	5	Clubs.		
	1903	40	7			
	1904	43	8			
	1905	46	9			
	1906	56	8			
	1907	54	9			
	*1908	42	8	2		
	1909	43	8	1		

* Apparent decrease is caused by re-arrangement of districts; increase of same number in Algoma.

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks
Norfolk	1874	73	6			
	1875	74	6			
	1876	51	4	2		
	1877	51	5	1		
	1878	55	5			
	1879	51	7			
	1880	51	6			
	1881	55	6			
	1882	56	6			
	1883	54	6			
	1884	51	4			
	1885	.....	.....	.....	.....	C. T. A. in force
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	37	4			
	1889	41	3			
	1890	39	2			
	1891	39	2			
	1892	41	2			
	1893	39	2			
	1894	35	2			
	1895	37	2			
	1896	31	2			
	1897	33	2			
	1898	32	2			
	1899	30	2			
	1900	29	2			
	1901	29	2			
	1902	29	2			
	1903	30	2			
	1904	29	2			
	1905	25	2			
	1906	22	2			
	1907	16	2			
	1908	17	2			
	1909	14	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Northumberland & Durham.	1874	135	35	2	1	
	1875	121	32	2	1	
	1876	102	27	4	1	
	1877	103	25	2	1	
	1878	89	21	2	2	Dunkin Act in force for ten months except in Port Hope and Cobourg.
	1879	98	21	.....	1	
	1880	100	22	....	1	
	1881	100	23	. .....	1	
	1882	102	23	.....	1	
	1883	104	23	.....	1	
	1884	101	19			
	1885	97	16			
	1886	. .....	. .....	....	..... .	C. T. A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	. .....	.....	.....	" "
	1889	81	14			
	1890	74	13			
	1891	77	15			
	1892	76	14			
	1893	75	10			
	1894	68	9			
	1895	66	8			
	1896	64	9			
	1897	61	7			
	1898	59	7			
	1899	57	7			
	1900	55	7			
	1901	56	7			
	1902	56	7			
	1903	55	7			
	1904	53	7			
	1905	50	7			
	1906	48	6			
	1907	44	5			
	1908	26	4			
	1909	23	4			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Ontario	1874	86	35			
	1875	87	23			
	1876	60	10			
	1877	58	9			
	1878	55	8	2	.....	Dunkin Act in force for ten months.
	1879	61	9			
	1880	65	11			
	1881	66	12			
	1882	71	13			
	1883	72	12			
	1884	68	11			
	1885	67	12			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	64	7			
	1890	62	7			
	1891	60	4			
	1892	57	6			
	1893	50	5			
	1894	47	4			
	1895	45	4			
	1896	44	4			
	1897	50	4			
	1898	49	4			
	1899	45	4			
	1900	46	4			
	1901	46	4			
	1902	46	4			
	1903	44	4			
	1904	41	3			
	1905	42	3			
	1906	32	3			
	1907	31	3			
	1908	30	3			
	1909	30	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Oxford	1874	104	39			
	1875	102	25			
	1876	73	9	4		
	1877	70	10	1		
	1878	71	10			
	1879	74	12			
	1880	74	14			
	1881	73	13			
	1882	74	11			
	1883	72	9			
	1884	62	8			
	1885	.....	.....	.....	.....	C. T. A. in force
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	"
	1888	.....	.....	.....	.....	" "
	1889	52	6	1		
	1890	58	7	1		
	1891	57	5	1		
	1892	50	5			
	1893	50	6			
	1894	48	6			
	1895	48	5			
	1896	47	5			
	1897	47	5			
	1898	47	5			
	1899	47	5			
	1900	47	5			
	1901	47	5			
	1902	45	5			
Not including Woodstock	1903	33	3			
" " "	1904	31	3			
" " "	1905	28	3			
" " "	1906	24	3			
" " "	1907	22	2			
" " "	1908	19	2			
" " "	1909	20	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Peel	1874	91	15			
	1875	86	15			
	1876	49	10			
	1877	57	9			
	1878	60	8			
	1879	57	7			
	1880	62	7			
	1881	56	7			
	1882	57	6			
	1883	57	5			
	1884	55	4			
	1885	58	4			
	1886	55	5			
	1887	56	4			
	1888	57	3			
	1889	52	3			
	1890	52	3			
	1891	51	3			
	1892	47	3			
	1893	48	2			
	1894	47	2			
	1895	46	2			
	1896	47	2			
	1897	47	2			
	1898	42	2			
	1899	40	2			
	1900	42	2			
	1901	40	2			
	1902	39	2			
	1903	39	1			
	1904	41	1			
	1905	25				
	1906	24				
	1907	20			Club.	
	1908	20				
	1909	20	.....	.....	2	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Perth	1874	145	23			
	1875	135	25			
	1876	101	13	3		
	1877	105	17			
	1878	105	17			
	1879	110	18			
	1880	110	19			
	1881	106	19			
	1882	110	19			
	1883	109	17			
	1884	102	14			
	1885	93	14			
	1886	95	12			
	1887	95	13			
	1888	96	10			
Not including Stratford.....	1889	74	5			
" "	1890	72	5			
" "	1891	69	4			
" "	1892	68	5			
" "	1893	65	6			
" "	1894	62	5			
" "	1895	61	5			
" "	1896	58	5			
" "	1897	59	5			
" "	1898	57	5			
" "	1899	55	5			
" "	1900	53	6			
" "	1901	53	6			
" "	1902	54	6			
" "	1903	53	6			
" "	1904	48	6			
" "	1905	48	6			
" "	1906	40	6			
" "	1907	44	6			
" "	1908	46	6			
" "	1909	43	4			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Peterborough	1874	98	16			
	1875	72	16			
	1876	40	11	2	1	
	1877	43	11	.....	1	
	1878	35	11	.....	1	Dunkin Act in force in part of West Riding for 10 months.
	1879	42	13	.....	1	
	1880	46	12	.....	1	
	1881	46	14	.....	1	
	1882	50	15	.....	1	
	1883	50	14	.....	1	
	1884	46	13	.....	1	
	1885	43	12			
	1886	.....	.....	.....	.....	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.....	.....	.....	" "
	1889	43	10	... .	1	" "
	1890	41	11			
	1891	45	9			
	1892	46	8			
	1893	43				
	1894	39				
	1895	47	6			
	1896	47	6			
	1897	43	6			
	1898	40	6			
	1899	38	6	1		
	1900	38	5	1		
	1901	38	5	1		
	1902	37	5	1		
	1903	37	6	1		
	1904	37	6	1		
	1905	33	5	1		
	1906	27	4			
Not including City of Peterborough	1907	6				
" " "	1908	5				
" " "	1909	2				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Prescott and Russell.....	1874	63	10	1		
	1875	58	11			
	1876	52				
	1877	46	5			
	1878	49	5			
	1879	41	5			
	1880	42	4			
	1881	50	5			
	1882	53	6			
	1883	62	7			
	1884	65	4			
	1885	65	3			
	1886	68	1			
	1887	78	1			
	1888	76	1			
	1889	76	1			
	1890	78	2			
	1891	75	3			
	1892	77	2			
	1893	72	2			
	1894	69	3			
	1895	71	3			
	1896	76	3			
	1897	76	4			
	1898	72	4			
	1899	74	4			
	1900	76	4			
	1901	77	5			
	1902	78	5			
	1903	77	5			
	1904	75	5			
	1905	76	4			
	1906	77	4			
	1907	69	4			
	1908	71	3			
	1909	72	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Prince Edward	1874	22	3	.....	3	
	1875	33	3	.....	1	
	1876	.....	.....	1	1	Dunkin Act in force.
	1877	.....	.....	.....	.....	" "
	1878	.....	.....	.....	.....	" "
	1879	23	2	.....	1	
	1880	24	2	.....	3	
	1881	24	3	.....	1	
	1882	22	3	.....	2	
	1883	23	4	.....	2	
	1884	21	1	.....	2	
	1885	23	2	.....	2	
	1886	24	2			
	1887	21	2	.....	2	
	1888	18	2			
	1889	16	2			
	1890	18	2			
	1891	18	2			
	1892	17	2			
	1893	16	2			
	1894	15	2			
	1895	15	2			
	1896	14	2			
	1897	13	2			
	1898	13	2			
	1899	12	2			
	1900	12	2			
	1901	12	2			
	1902	12	2			
	1903	13	1			
	1904	12	1			
	1905	11	1			
	1906	9	1			
	1907	9	1			
	1908	9	1			
	1909	5	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks
Renfrew	1874	100	35	.....	1	
	1875	102	30	1	1	
	1876	51	20	.....	1	
	1877	42	17			
	1878	31	15			
	1879	36	16			
	1880	42	21			
	1881	47	17			
	1882	48	23			
	1883	63	30			
	1884	44	20	.....	.....	C.T.A. in force.
	1885	.....	.....	.....	.....	" "
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	55	12			
	1889	55	16			
	1890	56	16			
	1891	55	13			
	1892	58	14			
	1893	60	13			
	1894	66	15			
	1895	65	17			
	1896	63	16			
	1897	62	14			
	1898	58	14			
	1899	60	14			
	1900	60	14			
	1901	60	14			
	1902	59	15			
	1903	59	10			
	1904	58	10			
	1905	56	10			
	1906	57	9			
	1907	56	9			
	1908	52	9			
	1909	46	8			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Simcoe	1874	223	42			
	1875	196	35	2	2	
	1876	135	24	2	- 2	
	1877	137	24	1	2	
	1878	149	21	1	1	
	1879	142	20	1	1	
	1880	155	23	1	1	
	1881	144	23	1	1	Mono and Mulmur attached to new County of Dufferin.
	1882	146	23			
	1883	147	26			
	1884	138	24			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	121	17			
	1889	134	18			
	1890	123	17			
	1891	113	15			
	1892	117	12			
	1893	113	11			
	1894	106	11			
	1895	105	11			
	1896	102	10			
	1897	100	9			
	1898	97	9			
	1899	95	9			
	1900	97	8			
	1901	96	8			
	1902	95	8			
	1903	90	8			
	1904	88	8			
	1905	84	8			
	1906	81	7			
	1907	69	6			
	1908	54	6			
	1909	51	5			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Stormont, Dundas and Glengarry.	1874	122	31			
	1875	80	28			
	1876	82	22			
	1877	87	17			
	1878	94	17			
	1879	91	16			
	1880	91	18			
	1881	96	18			
	1882	95	18			
	1883	89	17			
	1884	92	15			
	1885	.....	.....	.....	.....	C. T. A. in force.
	1886	.....	.....	.....	.....	" "
	1887	.....	.....	.....	.....	" "
	1888	105	8			
	1889	111	10			
	1890	103	8			
	1891	96	10			
	1892	94	10			
	1893	84	8			
	1894	82	8	1		
	1895	80	4			
	1896	79	4			
	1897	78	4			
	1898	74	3	1		
	1899	75	3			
	1900	73	2			
	1901	74	2			
	1902	73	2			
	1903	71	2			
	1904	72	3			
	1905	64	4			
	1906	54	2			
	1907	54	2			
	1908	53	2			
	1909	40	2			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Victoria	1874	78	13	1		
	1875	70	9		1	
	1876	55	5	1		
	1877	56	5			
	1878	56	6			
	1879	60	6			
	1880	59	5			Including Haliburton.
	1881	62	4			
	1882	62	3		1	
	1883	62	3			
	1884	58	3			
	1885	54	3			
	1886					C.T.A. in force.
	1887					" "
	1888					" "
	1889	46	2			
	1890	44	2			
	1891	47	2			
	1892	40	3			
	1893	39	3			
	1894	38	3			
	1895	33	2			
	1896	33	2			
	1897	33	1			
	1898	32	1			
	1899	29	1			
	1900	29	1			
	1901	30	1			
	1902	30	1			
	1903	26	1			
	1904	25	1			
	1905	26	1			
	1906	25	1			
	1907	24	1			
	1908	15	1			
	1909	15	1			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Waterloo	1874	136	21			
	1875	136	20	3		
	1876	86	19	13		
	1877	84	17	10		
	1878	87	17			
	1879	89	15			
	1880	87	15			
	1881	88	16			
	1882	90	17			
	1883	91	15	.....	1	
	1884	92	14			
	1885	90	13			
	1886	87	12			
	1887	87	12			
	1888	90	9	1		
	1889	91	10	1		
	1890	92	10	1		
	1891	91	10	1		
	1892	90	11	1		
	1893	90	10	1		
	1894	88	10	1		
	1895	89	10	3		
	1896	90	10	5		
	1897	88	10	3		
	1898	86	10	2		
	1899	85	11	2		
	1900	86	10	2		
	1901	85	10	2		
	1902	85	8	1		
	1903	81	8	1		
	1904	80	10	1		
	1905	78	10		Clubs.	
	1906	78	10			
	1907	76	10			
	1908	76	10	.....	1	
	1909	75	10	.....	1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Welland.....	1874	145	28	3		
	1875	151	23			
	1876	73	19			
	1877	80	19			
	1878	89	21			
	1879	92	25			
	1880	87	29			
	1881	81	19			
	1882	78	20			
	1883	79	18			
	1884	82	14			
	1885	79	15			
	1886	82	12			
	1887	78	10			
	1888	70	8			
	1889	73	9			
	1890	73	9			
	1891	70	9			
	1892	71	9			
	1893	66	10			
	1894	64	10			
	1895	66	10			
	1896	65	9			
	1897	63	9			
	1898	62	9			
	1899	60	9			
	1900	64	9			
	1901	65	10			
	1902	64	10			
	1903	61	10			
	1904	61	10			
	1905	59	10			
	1906	64	10			
	1907	65	10			
	1908	64	10			
	1909	59	10			

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Wellington	1874	183	52			
	1875	182	41	3		
	1876	138	29	3		
	1877	130	28	3		
	1878	134	29			
	1879	138	29			
	1880	145	30			
	1881	134	24	.....	.....	Orangeville, Amaranth and East Garafraxa attached to new County of Dufferin.
	1882	128	26			
	1883	126	22			
	1884	116	19			
	1885	104	13			
	1886	.....	.....	.....	... .	C.T.A. in force.
	1887	.....	.....	.....	.....	" "
	1888	.....	.. ..	.....	.....	" "
Not including Guelph.....	1889	78	5			
" "	1890	77	4			
" "	1891	80	3			
" "	1892	79	9			
" "	1893	76	2			
" "	1894	72	2			
" "	1895	71	1			
" "	1896	71	1			
" "	1897	68	1			
" "	1898	64	1			
" "	1899	63	1			
" "	1900	62	1			
" "	1901	62	1			
" "	1902	61	1			
" "	1903	58	1			
" "	1904	57				
" "	1905	49				
" "	1906	44				
" "	1907	42				
" "	1908	39				
" "	1909	39				

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Wentworth (not including Hamilton).	1874	110	32	4		
	1875	107	19	2		
	1876	61	11	2		
	1877	56	10			
	1878	47	6			
	1879	63	6			
	1880	56	6			
	1881	55	6			
	1882	51	6			
	1883	52	6			
	1884	54	6			
	1885	54	6			
	1886	49	6			
	1887	51	5			
	1888	47	4			
	1889	49	3			
	1890	49	4			
	1891	49	3			
	1892	46	3			
	1893	45	3			
	1894	42	3			
	1895	41	3			
	1896	38	3			
	1897	38	3			
	1898	39	3			
	1899	39	3			
	1900	39	3			
	1901	39	3			
	1902	37	3		Clubs.	
	1903	34	3			
	1904	34	3			
	1905	35	1			
	1906	33	1		1	
	1907	30	1		2	
	1908	22	1		2	
	1909	21	1		2	

SCHEDULE A.—Comparative Statement, etc.—Continued.

County.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
York (not including Toronto).	1874	148	39			
	1875	164	35			
	1876	108	16	1		
	1877	97	15			
	1878	.....	.....	.....	.....	Dunkin Act in force.
	1879	114	15	.....	.....	Dunkin Act in force one month, May.
	1880	117	16			
	1881	128	21			
	1882	131	24			
	1883	132	23			
	1884	121	13			
	1885	114	12			
	1886	116	10			
	1887	109	7			
	1888	107	2			
	1889	112	1			
	1890	108	2			
	1891	105	3			
	1892	108	4			
	1893	104	4			
	1894	103	4			
	1895	102	4			
	1896	100	4			
	1897	100	4			
	1898	98	4			
	1899	97	2			
	1900	92	2			
	1901	92	2	1		
	1902	92	2	1		
	1903	91	2	1		
	1904	84	1	1		
	1905	73	1		Clubs.	
	1906	54	1			
	1907	50	1		2	
	1908	51	1		4	
	1909	46	1		4	

SCHEDULE A.—Comparative Statement, etc:—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Toronto.....	1874	309	184	21	16	
	1875	299	128	28	9	
	1876	216	100	39	9	
	1877	182	100	26	6	
	1878	181	92	20	10	
	1879	195	88	19	6	
	1880	204	94	18	4	
	1881	210	95	15	6	
	1882	216	100	14	7	
	1883	197	98	14	5	
	1884	217	88	13	3	
	1885	227	71	*14	2	
	1886	224	66	13	3	
	1887	150	50	13	1	
	1888	150	50	12	3	
	1889	152	50	14	3	
	1890	150	50	11		
	1891	150	50	11		
	1892	150	50	10		
	1893	149	50	10		
	1894	150	50	11		
	1895	150	50	8		
	1896	150	50	9		
	1897	150	50	6		
	1898	150	50	6		
	1899	150	50	6		
	1900	150	50	5		
	1901	150	50	7		
	1902	150	50	5		
	1903	150	50	6		
	1904	150	50	8	Clubs.	
	1905	147	50	11		
	1906	146	50		12	
	1907	144	50		15	
	1908	144	50		14	
	1909	110	50		20	

* Dominion issues.

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Hamilton.....	1874	127	93	.....	3	
	1875	110	72			
	1876	68	61	11	1	
	1877	68	55	7	2	
	1878	68	64	7	2	
	1879	68	61	8		
	1880	74	57	7		
	1881	89	55	7		
	1882	98	58	8		
	1883	105	54	8		
	1884	97	47	4		
	1885	110	48	3		
	1886	112	45	5		
	1887	107	40	4		
	1888	111	37	2		
	1889	91	38	3		
	1890	92	38	3		
	1891	91	37	3		
	1892	94	34	3		
	1893	94	30	3		
	1894	75	20	4		
	1895	75	20	4		
	1896	76	20	4		
	1897	75	20	3		
	1898	75	20	2		
	1899	75	20	2	Clubs.	
	1900	75	19	3		
	1901	75	19	3		
	1902	75	19	3		
	1903	75	19	3		
	1904	73	18	3		
	1905	68	17	5		
	1906	68	17		2	
	1907	68	17		3	
	1908	69	17		3	
	1909	66	16		3	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Ottawa.....	1874	120	77	6		
	1875	114	148	6		
	1876	75	77	7	1	
	1877	75	80	2	1	
	1878	73	77	.....	1	
	1879	73	71	.....	1	
	1880	75	72	.....	1	
	1881	75	77	.....	1	
	1882	75	76	.....	1	
	1883	75	84	.....	1	
	1884	75	78	.....	1	
	1885	75	77			
	1886	75	69	1		
	1887	75	68	1	1 B. & W.	
	1888	76	54	2	1	
	1889	80	56	1	1 B. & W	
	1890	88	59	2		
	1891	87	59	1		
	1892	78	46	1		
	1893	72	40	5		
	1894	71	38	5		
	1895	70	33	3		
	1896	76	33	4		
	1897	77	33	5		
	1898	80	33	6		
	1899	78	32	7		
	1900	75	32	9		
	1901	76	32	8		
	1902	76	32	7		
	1903	77	31	6	Clubs.	
	1904	67	31	5		
	1905	67	31	5		
	1906	67	31	.....	3	
	1907	65	31	.....	3	
	1908	65	26	.....	3	
	1909	64	24	.....	3	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
London.....	1874	75	40	3		
	1875	75	74	2		
	1876	57	34	5		
	1877	58	35	1		
	1878	58	37	1		
	1879	57	36	2		
	1880	45	27	2		
	1881	45	24	2		
	1882	47	26	3		
	1883	47	24	2		
	1884	48	22	2		
	1885	49	23	1		
	1886	61	21	2		
	1887	54	19	2		
	1888	57	14	1		
	1889	58	13	1		
	1890	56	12	1		
	1891	41	10	1		
	1892	34	6	3		
	1893	34	6	5		
	1894	34	6	2		
	1895	35	6	2		
	1896	34	6	2		
	1897	34	6	2		
	1898	34	6	2		
	1899	34	6	2	Clubs.	
	1900	35	6	2		
	1901	35	6	2		
	1902	35	6	2		
	1903	35	6	*1		
	1904	35	6	*1		
	1905	32	5	1		
	1906	26	5	.....	1	
	1907	26	5	.....	2	
	1908	26	5	.....	2	
	1909	26	5	.....	2	

*6 months.

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Kingston	1874	97	25	.....	1	
	1875	75	20	3	1	
	1876	53	23	6	5	
	1877	61	21	3	8	
	1878	61	21	3	8	
	1879	62	20	3	8	
	1880	62	20	3	8	
	1881	64	20	2	11	
	1882	53	22	2	9	
	1883	53	23	3	6	
	1884	39	20	2	6	
	1885	38	22	1	4	
	1886	41	22	1	6	
	1887	43	20	1	6	
	1888	44	15	1	7	
	1889	40	15	1		
	1890	38	15	1		
	1891	39	15	1		
	1892	41	15	1		
	1893	40	14	1		
	1894	38	13	1		
	1895	39	12			
	1896	37	12			
	1897	37	12			
	1898	36	12			
	1899	34	11			
	1900	34	11			
	1901	34	10			
	1902	34	10			
	1903	33	10	.....	Clubs.	
	1904	33	8			
	1905	33	7			
	1906	31	7			
	1907	28	7			
	1908	28	7	.....	2	
	1909	28	7	.....	1	
St. Catharines	1886	26	7			
	1887	29	7			
	1888	23	7			
	1889	26	6			
	1890	26	5			
	1891	26	4			
	1892	26	3			
	1893	26	3			
	1894	26	3			
	1895	26	3			
	1896	26	2			
	1897	26	2			
	1898	22	2			
	1899	24	2			
	1900	22	2			
	1901	21	2			
	1902	24	2	.....	Clubs.	
	1903	19	2			
	1904	19	2			
	1905	18	2			
	1906	19	2	.....	1	
	1907	19	2	.....	1	
	1908	19	2	.....	1	
	1909	16	2	.....	1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Brantford	1886	19	5	3		
	1887	18	5	3		
	1888	18	5	3		
	1889	18	5	3		
	1890	18	5	2		
	1891	18	5	1		
	1892	18	5	1		
	1893	18	5	1		
	1894	18	5	1		
	1895	16	5	1		
	1896	16	5	1		
	1897	16	5	.....	1	
	1898	16	4			
	1899	16	4			
	1900	17	4			
	1901	17	4			
	1902	16	4			
	1903	17	4	.....	Clubs	
	1904	16	4			
	1905	17	4			
	1906	16	4			
	1907	16	4	.....	1	
	1908	16	4	.....	1	
	1909	16	4	.....	1	
St. Thomas.....	1899	20	6			
	1890	18	4			
	1891	18	4			
	1892	18	4			
	1893	18	4			
	1894	18	4			
	1895	18	4			
	1896	18	4			
	1897	18	3			
	1898	17	3			
	1899	17	4			
	1900	17	3			
	1901	17	2			
	1902	17	3			
	1903	17	3			
	1904	17	3			
	1905	16	3			
	1906	16	3			
	1907	16	3			
	1908	16	3			
	1909	16	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Stratford	1889	21	4			
	1890	21	4			
	1891	21	4			
	1892	21	4			
	1893	19	4			
	1894	16	2			
	1895	16	2			
	1896	16	2			
	1897	16	2			
	1898	16	2			
	1899	16	2			
	1900	16	2			
	1901	16	2			
	1902	16	2			
	1903	15	2			
	1904	15	2			
	1905	13	2			
	1906	15	2			
	1907	16	2			
	1908	16	2			
	1909	15	2			
Guelph	1889	16	2			
	1890	16	2			
	1891	16	2			
	1892	16	2			
	1893	16	2			
	1894	16	2			
	1895	16	2			
	1896	16	2			
	1897	16	2			
	1898	16	2			
	1899	16	2			
	1900	14	2			
	1901	15	2			
	1902	15	2			
	1903	15	2			
	1904	15	2		Clubs.	
	1905	15	2			
	1906	15	2		1	
	1907	15	2		1	
	1908	15	2		1	
	1909	15	2		1	

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Belleville	1889	25	3	2		
	1890	25	3	2		
	1891	25	3	2		
	1892	25	3	2		
	1893	24	3	2		
	1894	24	3	2		
	1895	25	3	2		
	1896	26	3	1		
	1897	26	3	1		
	1898	21	2	1		
	1899	17	2			
	1900	18	2			
	1901	18	2			
	1902	18	2			
	1903	17	2			
	1904	16	3			
	1905	16	3			
	1906	16	3			
	1907	16	3			
	1908	16	3			
	1909	16	3			
Windsor	1891	22	4			
	1892	25	5			
	1893	27	4			
	1894	27	4			
	1895	27	4			
	1896	27	4			
	1897	27	3	1		
	1898	24	3	1		
	1899	22	3			
	1900	21	3			
	1901	23	3			
	1902	23	3			
	1903	23	3			
	1904	23	3			
	1905	19	3			
	1906	23	3			
	1907	23	3			
	1908	23	3			
	1909	23	3			

SCHEDULE A.—Comparative Statement, etc.—Continued.

City.	Year.	Tavern licenses.	Shop licenses.	Wholesale licenses.	Vessel licenses.	Remarks.
Chatham	1895	17	2			
	1896	18	2			
	1897	17	2			
	1898	16	2			
	1899	15	2			
	1900	15	2			
	1901	15	2			
	1902	15	2			
	1903	15	2			
	1904	15	2			
	1905	12	2			
	1906	13	2			
	1907	13	2			
	1908	14	2			
	1909	14	2			
Woodstock	1903	12	2			
	1904	12	2			
	1905	9	2			
	1906	9	2			
	1907	8	2			
	1908	9	2			
	1909	9	2			
					Club.	
Peterborough	1907	20	4	.....	1	
	1908	19	4	.....	1	
	1909	18	4	.....	1	

SCHEDULE A.—Comparative Statement, etc.—Concluded.

RECAPITULATION, showing the total number of Provincial licenses issued in the several counties in the province, including the cities, during the license years 1874-5-6-7-8-9-80-1-2 3-4-5-6-7-8-9-90-1-2-3-4-5-6-7-8-9-1900-1-2-3-4-5-6-7-8-9.

Years.	Tavern.	Shop.	Wholesale	Vessel.	Club.	Total.
1874	4,793	1,307	52	33	.....	6,185
1875	4,459	1,257	78	24	.....	5,818
1876	2,977	787	147	27	.....	3,938
1877	2,845	739	65	27	.....	3,676
1878	2,910	724	52	29	.....	3,715
1879	3,199	757	42	22	.....	4,020
1880	3,227	760	40	22	.....	4,049
1881	3,311	764	34	24	.....	4,133
1882	3,317	787	35	24	.....	4,163
1883	3,363	781	36	21	.....	4,201
1884	3,253	675	28	14	.....	3,970
1885	2,574	525	24	9	.....	3,132
1886	1,567	367	28	12	.....	1,974
1887	1,496	325	28	13	.....	1,862
1888	2,066	336	26	17	.....	2,445
1889	3,073	445	37	15	.....	3,560
1890	3,071	428	24	.....	.....	3,523
1891	2,990	403	21	.....	.....	3,414
1892	2,966	378	25	.....	.....	3,369
1893	2,888	357	31	.....	.....	3,276
1894	2,785	337	29	.....	.....	3,151
1895	2,779	327	26	.....	.....	3,132
1896	2,747	323	26	.....	.....	3,096
1897	2,725	317	22	.....	.....	3,064
1898	2,641	312	23	.....	.....	2,976
1899	2,611	308	21	.....	.....	2,950
1900	2,621	303	24	.....	.....	2,948
1901	2,613	308	26	.....	.....	2,947
1902	2,628	307	22	.....	.....	2,957
1903	2,577	300	22	.....	.....	2,899
1904	2,516	298	22	.....	.....	2,836
1905	2,384	283	24	.....	.....	2,691
1906	2,207	267	23	.....	24	2,521
1907	2,110	262	25	.....	35	2,432
1908	2,010	253	23	.....	42	2,328
1909	1,873	245	32*	.....	50	2,200

The Six Months' Licenses and the Licenses *extended* do not appear in the above Schedule or recapitulation. Beer and Wine Licenses are included with the ordinary licenses, under the heads of Tavern Licenses and Vessel Licenses respectively. An *extended* License is good for a period not exceeding three months. It is not in the nature of a new License, but simply a permission, granted by the Board of Commissioners to the holder of a License expiring in April, to continue his business under the old license for the specified period, that he may be able to dispose of his stock on hand and quit the business without loss. Six Months' Licenses run from the first day of May to the thirty-first day of October, and are not valid after the latter date. They are granted to localities which are largely resorted to in summer by visitors, where the Board of Commissioners is of the opinion that increased tavern accommodation for the summer months is necessary.

* A change in the Act, compelling firms outside of the Province to take out a License to sell to the trade in Ontario, is the cause of the increase. Eleven Wholesale Licenses were issued to firms and chartered companies, who formerly sold to the trade in Ontario without having to procure a license in this Province.

SCHEDULE B.

SCHEDULE B.

STATEMENT BY MUNICIPALITIES, showing the number of Provincial Licenses, whether ordinary, Beer and Wine, or Club, issued; the number extended or transferred; number of bartenders' licenses issued; the sums deposited to the credit of the License Fund Accounts for licenses only; the revenue paid over to the Municipal treasurers, and the amounts received by the Province from licenses for the license year 1909-10.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Addington ...	Newburg, Village	1	.....	.....	.....	.....	1	.....	.....	1	.....	250 00	83 34	93 34
	Camden	7	.....	.....	.....	.....	7	.....	.....	.....	.....	840 00	280 00	280 00
	Sheffield	5	.....	.....	.....	.....	5	.....	.....	.....	.....	600 00	200 00	200 00
	Kaladar and Anglesea	1	1	.....	.....	.....	2	.....	.....	1	.....	210 00	70 00	70 00
	Barrie	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	40 00	40 00
	*Kennebec	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
	Olden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Oso	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	80 00	80 00
	Hinchinbrooke	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	80 00	80 00
	Palmerston and Canonto	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	40 00	40 00
	Clarendon and Millar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Abinger, Ashby and Denbigh	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	150 17	.....	.....
	Refund of costs	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20 00	.....	.....
	Totals	20	1	.....	.....	.....	21	.....	.....	3	.....	2,790 17	873 34	873 34

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Algoma	St. Joseph													
	Hilton	1					1				1	122 00	48 33	48 34
	Thessalon, Town	3					3				7	764 00	307 92	307 92
	*Thessalon, Township													
	Plummer, add'l													
	Hallam													
	Salter and May and 116													
	*Johnson, Tarbutt, etc.													
	*Denison, Drury and Graham													
	Blind River	4					4			2	21	3,042 00	1,204 17	1,204 16
	Webbwood	2					2				6	512 00	213 25	213 25
	*McDonald, Meredith, etc.													
	Bruce Mines, Town	2					2				1	502 00	198 67	198 67
	Massey, Town	2					2				5	510 00	207 13	207 12
	Thompson													
	†Unorganized Territory	4					4				7	494 00		406 16
	Transferred from previous year											102 61		
	Totals	18					18			2	48	6,048 61	2,179 47	2,585 62

* Local Option. † Payable to Province, less proportion of expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Brant.	South Dumfries	2					2					240 00	100 00	100 00
	Brantford Township, North	3					3			1		360 00	150 00	150 00
	Onondaga													
	Burford	2					2					240 00	100 00	100 00
	Paris, Town	6			1		7			1	10	2,470 00	1,029 17	1,029 17
	Transferred from previous year											49 00		
	Totals	13			1		14			2	10	3,359 00	1,379 17	1,379 17
South Brant..	Brantford Township, South	2					2					240 00	109 80	109 80
	Oakland	1					1					120 00	54 90	54 90
	Brantford City	16			4	1	21			1	37	10,124 00	4,632 39	4,632 39
	Transferred from previous year											120 23		
	Totals	19			4	1	24			1	37	10,604 23	4,797 09	4,797 09
Brockville	Brockville, Town	9			2	1	12				15	6,150 00	2,921 25	2,921 25
	*Rear of Yonge and Escott													
	Elizabethtown	1					1					120 00	57 00	57 00
	*Athens, Village													
	Elmsley, South	1					1					120 00	57 00	57 00
	Kitley	3					3			1		360 00	171 00	171 00
	Transferred from previous year											169 39		
	Totals	14			2	1	17			1	15	6,919 39	3,206 25	3,206 25

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Centre Bruce.	Paisley, Village	3	1 for 9 mons.	.....	.....	.....	3	.....	.....	.....	.....	687 50	289 06	289 07
	Kincardine, Town	5	.....	.....	1	.....	6	.....	.....	1	6	2,112 00	884 63	884 62
	Chesley, Town	3	.....	.....	.....	.....	3	.....	.....	1	6	762 00	318 94	318 93
	Greenock	5	.....	.....	.....	.....	5	.....	.....	1	.....	600 00	251 25	251 25
	*Huron	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Kincardine, Township	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	50 25	50 25
	Elderslie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	172 84	.....	.....
	Totals	17	.....	.....	1	.....	18	.....	.....	3	12	4,454 34	1,794 13	1,794 12
North Bruce..	Tiverton, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	93 75	93 75
	Port Elgin, Village	3	.....	1	.....	.....	4	.....	.....	.....	.....	875 00	328 13	328 12
	*Southampton, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Tara, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wiarton, Town	5	.....	.....	.....	.....	5	.....	.....	.....	11	1,772 00	664 50	664 50
	*Bruce	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Saugeen	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Arran	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Amabel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Eastnor	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	135 00	135 00
	Albemarle	1	.....	.....	.....	.....	1	.....	.....	.....	.....	135 00	50 63	50 63
	Hepworth, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	93 74	93 76
	Lindsay and St. Edmunds	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	St. Edmunds, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	166 97	.....	.....
	Totals	14	.....	1	.....	.....	15	.....	.....	.....	11	3,808 97	1,365 75	1,365 76

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Bruce..	Lucknow, Village	3	.....	.....	.....	.....	3	.....	.....	2	.....	750 00	328 13	328 13
	Teeswater, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	328 13	328 13
	Walkerton, Town	6	.....	.....	1	.....	7	.....	.....	1	5	2,460 00	1,076 25	1,076 24
	Culross	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	Carrick	7	.....	.....	.....	.....	7	.....	.....	.....	.....	840 00	367 50	367 50
	Brant	4	.....	.....	.....	.....	4	.....	.....	.....	.....	480 00	210 00	210 00
	Kinloss	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	113 79	.....	.....
	Totals	25	.....	.....	1	.....	26	.....	.....	3	5	5,633 79	2,415 01	2,415 00
Carleton	Richmond, Village	1	.....	.....	.....	.....	1	.....	.....	1	.....	250 00	25 00	25 00
	*March	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Huntley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Nepean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	North Gower	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	36 00	36 00
	*Goulborn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Marlborough	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Fitzroy	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	24 00	24 00
	Torbolton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3 24	.....	.....
	Totals	6	.....	.....	.....	.....	6	.....	.....	1	.....	853 24	85 00	85 00

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Dufferin	Orangeville, Town	6			1		7			1	4	2,458 00	1,075 28	1,075 27
	*Mulmur													
	*Mono													
	*Melancthon													
	*Garafraxa, East													
	Shelburne, Village	3					3					1,200 00	520 00	520 00
	*Amaranth													
	*East Luther													
	Grand Valley, Village	3					3			1		750 00	328 13	328 12
	Transferred from previous year											229 41		
	Totals	12			1		13			2	4	4,637 41	1,923 41	1,923 39
Dundas	*Iroquois, Village													
	Chesterville, Village	2					2					520 00	86 67	86 67
	Morrisburg, Village	3					3					750 00	125 00	125 00
	Winchester, Township													
	Matilda													
	Williamsburg													
	*Winchester, Village													
	*Mountain													
	Transferred from previous year													
	Totals	5					5					1,270 00	211 67	211 67

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
E. Durham...	Port Hope, Town	8	.....	.....	1	.....	9	.....	.....	1	6	3,322 00	1,349 19	1,349 19
	*Millbrook, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hope	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Cavan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Manvers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	106 01	.....	.....
	Totals	8	.....	.....	1	.....	9	.....	.....	1	6	3,428 01	1,349 19	1,349 19
W. Durham...	*Bowmanville, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	6 00	.....	.....
	Newcastle, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	.....	.....
	*Clarke	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Darlington	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Cartwright	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	172 68	.....	.....
	Totals	1	.....	.....	.....	.....	1	.....	.....	.....	3	428 68	.....	.....
East Elgin....	Aylmer, Town	4	.....	.....	.....	.....	4	.....	.....	.....	11	1,422 00	586 50	586 50
	Port Stanley, Village	2	.....	1	.....	.....	3	.....	.....	3	.....	650 00	263 25	263 25
	Springfield, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	103 12	103 13
	Vienna, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	103 13	103 12
	*Yarmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	South Dorchester	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Malahide	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bayham	5	.....	.....	.....	.....	5	.....	.....	.....	.....	600 00	247 50	247 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	64 96	.....	.....
	Totals	13	.....	1	.....	.....	14	.....	.....	3	11	3,236 96	1,303 50	1,303 50

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West Elgin...	St. Thomas, City	16	.....	.....	3	.....	19	.....	.....	3	29	9,558 00	4,181 63	4,181 62
	*Southwold	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dunwich	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	105 00	105 00
	Aldborough	1	.....	.....	.....	.....	1	.....	.....	.....	.....	130 00	56 88	56 88
	Dutton, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	520 00	227 50	227 50
	West Lorne, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	328 12	328 12
	Rodney, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	218 75	218 75
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	26	.....	.....	3	.....	29	.....	.....	4	29	11,678 00	5,117 88	5,117 87
North Essex..	Maidstone	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	135 00	135 00
	Rochester	4	.....	.....	.....	.....	4	.....	.....	.....	.....	480 00	180 00	180 00
	East Sandwich	12	.....	.....	1	.....	13	2	.....	2	.....	1,700 00	637 50	637 50
	West Sandwich	10	.....	1	.....	.....	11	.....	.....	3	.....	1,260 00	472 50	472 50
	Belle River, Village	3	.....	.....	1	.....	4	.....	.....	.....	.....	1,020 00	382 51	382 50
	Anderdon	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	90 00	90 00
	Tilbury N.	2	.....	.....	.....	.....	2	.....	.....	.....	.....	400 00	150 00	150 00
	South Sandwich	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	90 00	90 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	111 57	.....	.....
	Totals	38	.....	1	2	.....	41	2	.....	6	.....	5,811 57	2,137 51	2,137 50

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Essex..	*Mersea													
	Leamington, Town	3			1		4				5	1,410 00	556 92	556 92
	Amherstburg, Town	3		1	1		5	1		1	9	1,680 00	665 10	665 10
	Malden	2					2					240 00	94 80	94 80
	*Gosfield, South													
	Kingsville, Town	2					2			1	2	504 00	199 08	199 08
	Essex, Town	3					3				5	820 00	323 91	323 91
	*Colchester, North													
	Colchester, South	1					1					175 00	69 13	69 12
	Pelee Island	1					1					120 00	47 40	47 40
	Tilbury, West	3					3			1		525 00	207 37	207 38
	Gosfield, North													
	Transferred from previous year													
	Totals	18		1	2		21	1		3	21	5,474 50	2,163 71	2,163 71
Fort William.	Fort William	13			3	1	17			7	56	8,162 00	3,754 52	3,754 52
	Paipoonge	1					1			1		200 00	92 00	92 00
	†Unorganized	1					1					120 00		110 40
	Transferred from previous year											155 18		
	Totals	15			3	1	19			8	56	8,637 18	3,846 52	3,956 92

* Local Option. † Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Frontenac ...	Portsmouth, Village	2					2					500 00	125 00	125 00
	*Kingston, Township													
	*Portland													
	Pittsburg													
	Garden Island, Village													
	*Storrington													
	Wolfe Island	2					2					240 00	60 00	60 00
	Howe Island													
	Loughboro	2					2					240 00	60 00	60 00
	Bedford	1					1			1		120 00	30 00	30 00
	Transferred from previous year											62 74		
	Totals	7					7			1		1,162 74	275 00	275 00
Glengarry	Alexandria	3					3			1	10	1,070 00	401 26	401 24
	Charlottenburg	4		1			5			1		900 00	337 50	337 50
	Lancaster, Township	2					2					250 00	93 75	93 76
	Kenyon	4					4			1		500 00	187 49	187 50
	Lochiel	2					2					300 00	112 50	112 50
	Lancaster, Village	2					2			1		500 00	187 50	187 50
	Maxville, Village	2					2			1		500 00	187 50	187 50
	Transferred from previous year											103 88		
	Totals	19		1			20			5	10	4,123 88	1,507 50	1,507 50

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Grenville	Prescott, Town	5	.....	.....	2	.....	7	.....	.....	.....	9	2,468 00	1,079 75	1,079 76
	*Cardinal, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Kemptville, Village	2	.....	.....	.....	.....	2	1	.....	.....	.....	562 50	246 09	246 10
	Merrickville, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	218 75	218 75
	Augusta	1	.....	1	.....	.....	2	.....	.....	.....	.....	180 00	78 75	78 75
	Wolford	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	Oxford	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	105 00	105 00
	South Gower	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Edwardsburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89 88	.....	.....
	Totals	13	.....	1	2	.....	16	1	.....	2	9	4,160 38	1,780 84	1,780 86
Centre Grey..	*Thornbury, Town.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Artemesia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Holland	2	.....	.....	.....	.....	2	.....	.....	2	.....	240 00	50 00	50 00
	*Collingwood, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Euphrasia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Osprey	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sullivan	1	.....	.....	.....	.....	1	.....	.....	1	.....	120 00	25 00	25 00
	Markdale Village	3	.....	.....	.....	.....	3	.....	.....	1	.....	750 00	156 25	156 25
	Chatsworth, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	52 09	52 08
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35 99	.....	.....
	Totals	7	.....	.....	.....	.....	7	.....	.....	4	.....	1,395 99	283 34	283 33

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c	$ c.
North Grey...	*Owen Sound, Town													
	Meaford, Town	2					2				4	708 00	238 16	238 15
	*Derby													
	*Keppell													
	*Sydenham													
	St. Vincent													
	*Sarawak											800 00†		
	Transferred from previous year											49 34		
	Totals	2					2				4	1,557 34	238 16	238 15
South Grey...	*Proton													
	*Durham, Town													
	Bentinck	2					2			1		240 00	96 00	96 00
	Glenelg	1					1					120 00	48 00	48 00
	Normanby	5					5					600 00	240 00	240 00
	*Egremont													
	Dundalk, Village	3					3					750 00	300 00	300 00
	Hanover, Town	4					4			2	7	1,414 00	565 60	565 60
	Neustadt, Village	2					2					500 00	200 00	200 00
	Transferred from previous year											74 38		
	Totals	17					17			3	7	3,698 38	1,449 60	1,449 60

* Local Option. † Transferred from L.O.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Haldimand ...	Cayuga, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	312 50	312 50
	Caledonia, Village	3	.....	.....	.....	.....	3	.....	.....	2	.....	750 00	312 50	312 50
	Oneida	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Cayuga, North, Township	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	50 00	50 00
	Cayuga, South	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dunn	1	.....	1	.....	.....	2	.....	.....	.....	.....	180 00	75 00	75 00
	Rainham	4	.....	.....	.....	.....	4	.....	.....	2	.....	480 00	200 01	199 99
	Walpole	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	150 00	150 00
	*Seneca	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hagersville, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	312 50	312 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	164 94	.....	.....
	Totals	18	.....	1	.....	.....	19	.....	.....	4	.....	3,554 94	1,412 51	1,412 49
Haliburton ...	Minden	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	40 00	40 00
	Dysart	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	40 00	40 00
	Anson	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	40 00	40 00
	Sherbourne	2	.....	.....	.....	.....	2	.....	.....	2	.....	240 00	80 00	80 00
	Glamorgan	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	40 00	40 00
	Snowden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Monmouth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stanhope	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	48 22	.....	.....
	Totals	6	.....	.....	.....	.....	6	.....	.....	2	.....	768 22	240 00	240 00

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Halton	Nelson	....	.....	1	.....	.....	1	.....	.....	.....	.....	100 00	41 67	41 67
	*Nassagaweya	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Esquesing	3	.....	1	.....	.....	4	.....	.....	.....	.....	420 00	175 00	175 00
	Burlington, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	208 34	208 34
	Georgetown, Village	3	.....	.....	.....	.....	3	.....	.....	2	.....	750 00	312 49	312 50
	Oakville, Town	2	.....	.....	.....	.....	2	.....	.....	2	4	708 00	295 00	295 00
	Milton, Town	3	.....	.....	.....	.....	3	.....	.....	1	6	762 00	317 50	317 50
	Acton, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	312 50	312 50
	*Trafalgar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	121 67	.....	.....
	Totals	16	.....	2	.....	.....	18	.....	.....	5	10	4,111 67	1,662 50	1,662 51
Hamilton	Hamilton, City	65	1	.....	16	3	85	2	1	3	111	58,122 00	28,162 25	28,162 25
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89 16	.....	.....
	Totals	65	1	.....	16	3	85	2	1	3	111	58,211 16	28,162 25	28,162 25
East Hastings	Tyendinaga	5	.....	.....	.....	.....	5	.....	.....	2	.....	600 00	180 00	180 00
	Hungerford	2	.....	.....	.....	.....	2	.....	.....	.....	.....	250 00	75 00	75 00
	*Thurlow	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Deseronto, Town	4	.....	.....	1	.....	5	.....	.....	.....	1	1,752 00	525 60	525 60
	*Tweed, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Huntingdon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45 00	.....	.....
	Totals	11	.....	.....	1	.....	12	.....	.....	2	1	2,649 00	780 60	780 60

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Hastings	Marmora and Lake	1					1					120 00	36 00	36 00
	*Stirling, Village													
	*Madoc, Township													
	Elzevir and Grimsthorpe	2					2					240 00	72 00	72 00
	*Tudor and Cashel													
	*Wollaston													
	Monteagle and Herschel	2					2					270 00	62 50	82 50
	*Rawdon													
	Madoc, Village	2					2					520 00	156 00	156 00
	Wicklow, Bangor and McClure	1					1			1		120 00	39 00	39 00
	Dungannon	1					1					120 00	36 00	36 00
	Carlow and Mayo													
	*Limerick													
	Faraday													
	Marmora, Village	2			1		3			1		770 00	231 00	231 00
	Bancroft, Village	2					2					500 00	150 00	150 00
	Transferred from previous year													
	Totals	13			1		14			2		2,660 00	782 50	802 50
West Hastings	Belleville, City	16			3		19			2	30	8,610 00	3,766 88	3,766 88
	Trenton, Town	7			2		9			2	15	3,180 00	1,391 25	1,391 24
	*Sidney													
	Transferred from previous year											29 87		
	Totals	23			5		28			4	45	11,819 87	5,158 13	5,158 12

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders.			
												$ c.	$ c.	$ c.
Centre Huron.	Grey	3	1	.....	.....	.....	4	.....	.....	1	.....	450 00	199 69	199 69
	McKillop	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	53 25	53 25
	Brussels, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	749 99	333 85	333 85
	Seaforth, Town	5	.....	.....	1	.....	6	.....	.....	1	5	2,110 00	936 27	936 28
	Goderich, Town	8	.....	.....	1	.....	9	.....	.....	.....	5	3,160 00	1,404 50	1,404 50
	Clinton, Town	5	.....	.....	1	.....	6	.....	.....	1	11	2,122 00	941 63	941 62
	Colborne	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	106 50	106 50
	*Hullett	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	105 93	.....	.....
	Totals	27	1	.. ..	3	.....	31	.....	.. ..	3	21	9,057 92	3,975 69	3,975 69
North Huron.	Morris	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	90 00	90 00
	Turnberry	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	Wroxeter, Village	1	.....	.....	.....	.....	1	.....	.....	1	.....	250 00	93 75	93 75
	Blyth, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	187 50	187 50
	Wingham, Town	5	.....	.....	.....	.....	5	.....	.....	1	3	1,756 00	658 50	658 50
	*Howick	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wawonash W.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Wawonash E.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Ashfield	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Howick	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 26	.....	.....
	Totals	11	.....	.....	.....	.....	11	.....	.....	3	3	2,867 26	1,074 75	1,074 75

* Local option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Huron	Exeter, Village	3	.....	.....	.....	.....	3	1	.....	1	.....	791 67	316 67	316 67
	Bayfield, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	200 00	200 00
	Stephen	7	.....	1	.....	.....	8	.....	.....	1	.....	900 00	360 00	360 00
	Hay	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	144 00	144 00
	Tuckersmith	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	96 00	96 00
	Goderich, Tp.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Usborne	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Stanley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hensall, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	239 79	.....	.....
	Totals	17	.....	1	.....	.....	18	1	.....	3	.....	3,031 46	1,116 67	1,116 67
Kenora	Van Horne	2	.....	.....	1 6 mo.	.....	3	.....	.....	1	10	510 00	216 70	216 70
	Kenora, Town	9	.....	.....	2	1	12	.....	.....	1	36	5,172 00	2,212 65	2,212 65
	Keewatin, Town	3	.....	.....	1	.....	4	.....	.....	.....	2	1,254 00	539 30	539 30
	†Unorganized Territory	4	.....	.....	.....	.....	4	.....	.....	.....	2	484 00	.....	405 20
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 98	.....	.....
	Totals	18	.....	.....	4	1	23	.....	.....	2	50	7,421 98	2,968 65	3,373 85

*Local Option. †Payable to Province less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Kent....	Howard	1	.....	.....	.....	.....	1	.....	.....	1	.....	120 00	43 50	43 50
	Blenheim, Town	3	.....	.....	.....	.....	3	.....	.....	3	2	814 00	295 13	295 12
	Dresden, Town	2	.....	.....	.....	.....	2	.....	.....	.....	2	544 00	197 25	197 25
	Thamesville, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	271 88	271 87
	*Camden	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Zone	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bothwell, Town	2	.....	.....	1	.....	3	.....	.....	1	3	776 00	281 38	281 37
	Harwich	2	.....	.....	.....	.....	2	.....	.....	.....	.....	250 00	90 62	90 63
	Orford	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	87 00	87 00
	Ridgetown, Town	2	.....	.....	1	.....	3	.....	.....	1	3	1,056 00	382 83	382 82
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	17	.....	.....	2	.....	19	.....	.....	6	10	4,550 00	1,649 59	1,649 56
West Kent....	Chatham, City	14	.....	.....	2	.....	16	.....	.....	.....	30	8,060 00	3,516 97	3,516 98
	Chatham, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dover, E. and W.	7	.....	.....	.....	.....	7	.....	.....	1	.....	840 00	367 50	367 50
	Wallaceburg, Town	4	.....	.....	1	.....	5	.....	.....	.....	5	1,760 00	765 60	765 60
	*Raleigh	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Tilbury, Village	3	.....	.....	.....	.....	3	1	.....	2	.....	812 50	356 25	356 25
	*Tilbury, East	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Romney	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	28	.....	.....	3	.....	31	1	.....	3	35	11,472 50	5,006 32	5,006 33

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Kingston	Kingston, City	28	.....	.....	7	1	36	....	....	2	30	17,609 50	8,040 27	8,040 25
	Transferred from previous year	.....	.....	.....	.....	.....	.....	....	.....	....	.....	20 00	.....	.....
	Totals	28	.....	.....	7	1	36	....	.....	2	30	17,629 50	8,040 27	8,040 25
East Lambton.	Bosanquet	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	46 50	46 50
	Forest, Town	2	.....	.....	.....	.....	2	.....	.....	1	2	504 00	195 35	195 35
	*Warwick	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Brooke	1	.....	.....	.....	.....	1	.....	.....	.....	.....	150 00	58 13	58 12
	*Wyoming, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Watford, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	290 62	290 63
	*Euphemia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Plympton	1	.....	.....	.....	.....	1	.....	.....	.....	.....	160 00	62 00	62 00
	*Arkona, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Thedford, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	193 75	193 75
	Alvinston, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	290 63	290 62
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	86 69	.....	.....
	Totals	13	.....	.....	.....	.....	13	.....	.....	2	2	3,020 69	1,136 98	1,136 97

* Local Option

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions.		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Taverns.	Shop.					
												$ c.	$ c.	$ c.
West Lambton	Petrolia, Town	5	.....	.....	1	.....	6	.....	.....	.....	6	2,112 00	950 40	950 40
	*Moore	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Sarnia, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sombra	5	.....	.....	.....	.....	5	.....	.....	.....	1	627 00	282 15	282 15
	Oil Springs, Village	3	.....	.....	.....	.....	3	.....	.....	.....	1	752 00	338 40	338 40
	*Enniskillen	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sarnia, Town	10	.....	.....	2	.....	12	.....	.....	1	25	5,450 00	2,452 50	2,452 50
	Point Edward, Village	2	.....	.....	.....	.....	2	.....	.....	.....	4	508 00	228 60	228 60
	*Dawn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Courtright, Village	1	.....	.....	.....	.....	1	.....	.....	.....	1	402 00	180 90	180 90
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	62 84	.....	.....
	Totals	26	.....	.....	3	.....	29	.....	.....	1	38	9,913 84	4,432 95	4,432 95
North Lanark.	Lanark, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	200 00	200 00
	Pakenham	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	144 00	144 00
	*Dalhousie	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Almonte, Town	4	.....	.....	.....	.....	4	.....	.....	.....	9	1,418 00	567 20	567 20
	Carleton Place, Town	6	.....	.....	.....	.....	6	1	.....	1	7	2,156 20	862 48	862 48
	Ramsey	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	96 00	96 00
	*Lanark, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Lavant	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	48 00	48 00
	Darling	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Beckwith	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	48 00	48 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	58 74	.....	.....
	Totals	19	.....	.....	.....	.....	19	1	.....	2	16	4,972 94	1,965 68	1,965 68

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Lanark	Perth, Town	6			2		8				12	2,824 00	1,147 75	1,147 75
	Smith's Falls, Town	5			1		6	2			12	2,949 00	1,205 69	1,205 69
	Montague													
	Elmsley, North													
	Burgess, North													
	Sherbrooke, North													
	Bathurst													
	Drummond	2					2					240 00	97 50	97 50
	*South Sherbrooke													
	Transferred from previous year											14 69		
	Totals	13			3		16	2			24	6,027 69	2,450 94	2,450 94
Leeds	Gananoque, Town	4		1			5				5	1,585 00	660 43	660 41
	Newboro', Village	1		1			2					375 00	156 25	156 25
	Bastard and Burgess	2					2					240 00	100 00	100 00
	North Crosby													
	*Leeds and Lansdowne, front													
	Leeds and Lansdowne, rear	2					2					240 00	100 00	100 00
	South Crosby	1		1		1	3					230 00	95 84	95 83
	Young, Front													
	Escott, Front													
	Westport, Village	3					3			1		750 00	312 50	312 50
	Transferred from previous year											127 97		
	Totals	13		3		1	17			1	5	3,547 97	1,425 02	1,424 99

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders			
												$ c.	$ c.	$ c.
Lennox	Napanee, Town	6			2		8			1	15	2,830 00	1,192 38	1,192 37
	Bath, Village	1					1					250 00	105 21	105 21
	Adolphustown													
	Amherst Island	1					1					120 00	50 00	50 00
	Ernestown	2					2					240 00	100 75	100 75
	North Fredericksburg													
	South Fredericksburg													
	*Richmond													
	Transferred from previous year											195 45		
	Totals	10			2		12			1	15	3,635 45	1,448 34	1,448 33
Lincoln	*Niagara, Township													
	*Grimsby, North													
	Grantham	1					1					120 00	48 00	48 00
	Merritton, Village	3					3					750 00	300 00	300 00
	*Grimsby, South													
	Port Dalhousie, Village	3					3					750 00	300 00	300 00
	*Clinton													
	*Grimsby, Village													
	Niagara, Town	3		1	1		5				4	1,153 00	461 20	461 20
	*Beamsville, Village													
	Louth	1					1			1		120 00	48 00	48 00
	Transferred from previous year											187 52		
	Totals	11		1	1		13			1	4	3,080 52	1,157 20	1,157 20

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
London	London, City	26			5	2	33			5	67	21,934 00	10,300 05	10,300 05
	Transferred from previous year											163 97		
	Totals	26			5	2	33			5	67	22,097 97	10,300 05	10,300 05
Manitoulin	Little Current, Town	3					3			1	6	762 00	247 95	247 95
	Gore Bay, Town	3					3			1	3	721 27	229 18	229 18
	Assignac	1					1				1	122 00	39 60	39 60
	Howland	1					1			1	1	122 00	39 70	39 70
	Gordon													
	*Tehkummah													
	Billings	1					1					120 00	39 00	39 00
	Carnarvon	1					1					120 00	39 00	39 00
	May, Slater and Massey													
	Nairn, Lorne and Hyman	2					2				6	252 00	85 00	85 00
	Hallam													
	Graham													
	Cockburn Island													
	†Unorganized Territory	2					2			1	3	246 00		166 00
	Transferred from previous year											182 06		
	Totals	14					14			4	20	2,647 33	719 43	885 43

* Local Option.

† Payable to Province, Less Expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Middlesex	London, Township	10	1	1			12			6		1,350 00	388 13	388 12
	Dorchester, North	2					2	1		1		280 00	80 25	80 25
	Westminster	4					4					480 00	138 00	138 00
	*Nissouri, West													
	Transferred from previous year													
	Totals	16	1	1			18	1		7		2,110 00	606 38	606 37
North Middlesex	*East Williams													
	West Williams													
	McGillivray													
	Adelaide	2					2					240 00	90 00	90 00
	Biddulph	2					2					270 00	101 25	101 25
	Ailsa Craig, Village	2					2					500 00	187 50	187 50
	Parkhill, Town	3					3			1	3	756 00	283 51	283 50
	Lucan, Village	3					3			1		750 00	281 25	281 24
	Strathroy, Town	5					5			1	8	1,766 00	662 25	662 25
	Metcalfe							1				10 00	3 75	3 75
	Transferred from previous year													
	Totals	17					17	1		3	11	4,292 00	1,609 51	1,609 49

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c
West Middlesex	Ekfrid	2					2			1		240 00	81 00	81 00
	Wardsville, Village	1					1					250 00	81 25	81 25
	Delaware	1					1					120 00	42 00	42 00
	*Caradoc													
	Glencoe, Village	3					3					780 00	253 50	253 50
	Mosa													
	Newbury, Village	1					1			1		250 00	81 25	81 25
	Lobo	2					2					240 00	78 00	78 00
	Transferred from previous year											53 73		
	Totals	10					10			2		1,933 73	617 00	617 00
Monck	Wainfleet	1					1					120 00	48 75	48 75
	Canborough							1				30 00	11 25	11 25
	*Caistor													
	Sherbrooke	1		1			2					180 00	71 25	71 25
	Dunville, Town	5			1		6				7	2,114 00	858 63	858 62
	*Gainsborough													
	*Pelham													
	Moulton													
	Transferred from previous year											131 23		
	Totals	7		1	1		9	1			7	2,575 23	989 88	989 87

*Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Muskoka	*McLean and Ridout.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Draper	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	48 00	48 00
	Gravenhurst, Town	3	.....	.....	.....	.....	3	.....	.....	.....	8	1,066 00	426 40	426 40
	Medora and Wood	1	.....	2	.....	.....	3	.....	.....	.....	.....	240 00	96 00	96 00
	Bracebridge, Town	4	.....	.....	1	.....	5	.....	.....	2	13	2,150 33	863 73	863 73
	Huntsville, Town	4	.....	.....	.....	.....	4	.....	.....	2	11	1,188 67	475 47	475 47
	Monck	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Morrison	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stisted	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Stephenson	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	48 00	48 00
	McAuley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Port Carling, Village.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Chaffey	.....	.....	1	.....	.....	1	.....	.....	.....	.....	60 00	24 00	24 00
	Ryde	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	†Unorganized Territory	.....	.....	4	.....	.....	4	.....	.....	2	.....	240 00	.....	192 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	98 21	.....	.....
	Totals	14	.....	7	1	.....	22	.....	.....	6	32	5,292 21	1,981 60	2,173 60

* Local Option.

† Payable to Province, less expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions.		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Nipissing	North Bay, Town	7	.....	.....	2	.....	9	.....	.....	1	19	4,188 00	1,832 26	1,832 25
	McKim	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Mattawa, Town	4	.....	.....	2	.....	6	.....	.....	2	6	2,092 00	915 25	915 25
	Widdifield	1	.....	.....	.....	.....	1	.....	.....	.....	1	202 00	88 37	88 38
	Bonfield, Town	2	.....	.....	.....	.....	2	.....	.....	1	3	506 00	221 37	221 38
	Head, Clara and Maria	3	.....	.....	.....	.....	3	.....	.....	.....	1	362 00	158 37	158 38
	*Jocelyn	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Ferris	2	.....	.....	.....	.....	2	.....	.....	1	2	244 00	106 75	106 75
	Milberta	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bonfield	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	†Unorganized Territory	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2 00	.....	1 75
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	62 82	.....	.....
	Totals	19	.....	.....	4	.....	23	.....	.....	5	33	7,658 82	3,322 37	3,324 14
North Norfolk.	Middleton	1	.....	.....	.....	.....	1	.....	.....	1	.....	120 00	50 00	50 00
	Simcoe, Town	4	.....	.....	2	.....	6	.....	.....	.....	6	2,112 00	880 01	880 00
	*Windham	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Townsend	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Waterford, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Delhi, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	208 33	208 33
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	128 35	.....	.....
	Totals	7	.....	.....	2	.....	9	.....	.....	1	6	2,860 35	1,138 34	1,138 33

*Local Option. †Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions.		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Norfolk	Walsingham, South	1					1	1				150 00	42 00	42 00
	Woodhouse and Gore													
	Charlotteville	1	1				2			1		210 00	56 00	56 00
	Houghton							1				30 00	10 00	10 00
	Port Dover, Village	2					2	1		1		562 50	154 17	154 17
	*Walsingham, North.													
	Port Rowan, Village	2					2			1		500 00	125 00	125 00
	Transferred from previous year													
	Totals	6	1				7	3		3		1,452 50	387 17	387 17
East Northumberland	*Seymour													
	*Murray													
	*Cramahe													
	Percy	2					2					300 00	37 50	37 50
	*Colborne, Village													
	*Campbellford, Town													
	Hastings, Village	2			1		3					770 00	122 29	122 29
	*Brighton, Village													
	Brighton, Township													
	Transferred from previous year											10 42		
	Totals	4			1		5					1,080 42	159 79	159 79

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West Northumberland	Alnwick	1					1					120 00	58 20	58 20
	*South Monaghan													
	*Haldimand, Township													
	*Hamilton, Township													
	Cobourg, Town	9		1	2		12				28	5,231 00	2,537 04	2,537 03
	Transferred from previous year											637 17		
	Totals	10		1	2		13				28	5,988 17	2,595 24	2,595 23
North Ontario	Uxbridge, Town	3			1		4				4	1,028 00	385 51	385 50
	Brock	2	1				3					330 00	123 75	123 75
	Mara	3					3				1	362 00	135 75	135 75
	Thorah													
	Uxbridge, Township	3					3					360 00	135 00	135 00
	*Scott													
	Rama													
	Cannington, Village	2					2			1		500 00	187 50	187 49
	Beaverton, Village	2					2					500 00	187 50	187 50
	Transferred from previous year											194 94		
	Totals	15	1		1		17			1	5	3,274 94	1,155 01	1,154 99

* Local option.

SCHEDULE B.—Continued.

License District.	Municipality	Tavern.			Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.				Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Ontario.	*Reach	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Oshawa, Town	4	.....	.....	.....	.....	4	.....	.....	3	8	1,896 00	805 80	805 80
	Whitby, Town	4	.....	.....	1	.....	5	.....	.....	.....	7	1,764 00	749 70	749 70
	Whitby, Township	2	.....	.....	.....	.....	2	.....	.....	.....	.....	260 00	110 50	110 50
	Whitby, East, Township	2	.....	.....	.....	.....	2	.....	.....	.....	.....	260 00	110 50	110 50
	Scugog	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Pickering, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Port Perry, Village	2	.....	.....	1	.....	3	.....	.....	.....	.....	770 00	327 25	327 26
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	162 41	.....	.....
	Totals	14	.....	.....	2	.....	16	.....	.....	3	15	5,112 41	2,103 75	2,103 76
Ottawa	Ottawa, City	64	.....	.....	24	3	91	1	2	9	180	62,635 00	30,000 00	30,000 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	64	.....	.....	24	3	91	1	2	9	180	62,635 00	30,000 00	30,000 00
North Oxford.	*East Nissouri	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Blandford	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	54 00	54 00
	East Zorra	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	53 25	53 25
	Embro, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	221 87	221 88
	West Zorra	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Woodstock, City	9	.....	.....	2	.....	11	.....	.....	2	16	4,982 00	2,210 84	2,210 83
	Blenheim, Township	4	.....	.....	.....	.....	4	.....	.....	2	.....	480 00	214 50	214 50
	Tavistock	3	.....	.....	1	.....	4	.....	.....	.....	.....	1,020 00	451 85	451 84
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	22 39	.....	.....
	Totals	20	.....	.....	3	.....	23	.....	.....	5	16	7,244 39	3,206 31	3,206 30

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Oxford.	Ingersoll, Town	6	.....	.....	1	.....	7	1	.....	2	14	3,290 50	1,316 20	1,316 20
	Tillsonburg, Town	3	.....	.....	1	.....	4	.....	.....	.....	6	1,412 00	564 80	564 80
	*Norwich, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*North Oxford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	North Norwich	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*South Norwich	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dereham	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	West Oxford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*East Oxford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	9	.....	.....	2	.....	11	1	.....	2	20	4,702 50	1,881 00	1,881 00
Parry Sound East	Nipissing	1	.....	.....	.....	.....	1	.....	.....	.....	1	122 00	45 75	45 75
	Chapman	1	.....	.....	.....	.....	1	.....	.....	1	1	122 00	45 75	45 75
	Himsworth, North	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	90 00	90 00
	Perry	3	.....	.....	.....	.....	3	.....	.....	.....	4	368 00	138 00	138 00
	Machar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Sundridge, Village	1	.....	.....	.....	.....	1	.....	.....	2	1	252 00	94 51	94 50
	Burk's Falls, Village	1	.....	1	.....	.....	2	.....	.....	.....	6	387 00	145 12	145 13
	Himsworth, South	2	.....	.....	.....	.....	2	.....	.....	.....	1	242 00	90 75	90 75
	McMurrich	1	.....	.....	.....	.....	1	.....	.....	.....	2	124 00	46 50	46 50
	Powassan, Town	2	.....	.....	.....	.....	2	.....	.....	.....	3	506 00	189 75	189 75
	South River, Village	1	.....	.....	.....	.....	1	.....	.....	.....	1	252 00	94 50	94 50
	Kearney, Town	2	.....	.....	.....	.....	2	.....	.....	.....	1	502 00	188 25	188 25
	†Unorganized Territory	1	.....	.....	.....	.....	1	.....	.....	1	.....	120 00	.....	90 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	308 17	.....	.....
	Totals	18	.....	1	.....	.....	19	.....	.....	4	21	3,545 17	1,168 88	1,258 88

* Local Option.

† Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders.			
Parry Sound West	McKellar											$ c.	$ c.	$ c.
	Christie	2					2					300 00	112 50	112 50
	Parry Sound, Town	2			‡1		3			1	4	2,008 00	753 00	753 00
	Foley	1					1				1	202 00	75 75	75 75
	Humphrey	1		2			3				1	242 00	90 75	90 75
	Hagerman	1					1					120 00	45 00	45 00
	*McDougall													
	†Unorganized Territory	5		1			6				3	666 00		499 50
	Transferred from previous year											249 45		
	Am't received from shop license distribution deferred											400 00		
	Totals	12		3	1		16			1	9	4,187 45	1,077 00	1,576 50
Peel	Brampton, Town	4					4				5	1,410 00	587 50	587 50
	*Chinguacousy													
	*Bolton, Village													
	Toronto, Township	5				1	6			3		650 00	270 83	270 83
	Toronto, Gore	1					1					120 00	50 00	50 00
	Streetsville, Village	2					2			1		500 00	208 33	208 34
	Albion	3					3					360 00	150 00	150 00
	Caledon	5				1	6					650 00	270 83	270 84
	Transferred from previous year											251 88		
	Totals	20				2	22			4	5	3,941 88	1,537 49	1,537 51

* Local Option. † Payable to Province, less expenses. ‡ 6 months.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Perth..	Mornington	8					8			2		960 00	441 60	441 60
	Ellice	4					4					480 00	220 80	220 80
	Wallace	1					1					120 00	55 20	55 20
	Elma	3					3					360 00	165 60	165 60
	Listowel, Town	4			1		5				3	1,756 00	807 76	807 74
	Stratford, City	16			2		18			5	14	9,028 00	4,154 06	4,154 04
	North Easthope	2					2			1		240 00	110 40	110 40
	Milverton, Village	2					2					50000	230 00	230 00
	Transferred from previous year													
	Totals	40			3		43			8	17	13,444 00	6,185 42	6,185 38
South Perth..	South Easthope	3					3			1		360 00	155 25	155 25
	*Fullarton													
	Mitchell, Town	4			1		5				3	1,276 00	560 15	560 13
	Hibbert	2					2			1		240 00	108 00	108 00
	Downie	3					3					360 00	153 00	153 00
	St. Mary's, Town	6			2		8			1	10	2,820 00	1,189 95	1,189 95
	Blanshard													
	Logan	1					1			1		120 00	54 00	54 00
	Transferred from previous year											233 72		
	Totals	19			3		22			4	13	5,409 76	2,220 35	2,220 33

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Peterborough	*Asphodel													
	*Dummer													
	Douro													
	*Otonabee													
	Burleigh and Anstruther	2					2					240 00		
	*Norwood, Village													
	*Lakefield, Village													
	Belmont and Methuen													
	Havelock, Village													
	Chandos													
	Transferred from previous year													
	Fines											190 00		
	Totals	2					2					430 00		
West Peterborough	*Smith													
	Peterborough, City	18		1	4	1	24			2	39	11,378 00	5,180 32	5,180 32
	North Monaghan													
	Ennismore													
	Harvey													
	Galway and Cavendish													
	Transferred from previous year											180 90		
	Totals	18		1	4	1	24			2	39	11,558 90	5,180 32	5,180 32

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Port Arthur..	Neebing	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Port Arthur, Town	15	.....	.....	2	1	18	.....	.....	1	66	8,682 00	4,037 14	4,037 12
	*Schreiber	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Nepigon	2	.....	.....	1	.....	3	.....	.....	.....	.....	740 00	344 10	344 10
	†Unorganized Territory	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	.....	111 60
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	103 26	.....	.....
	Totals	18	.....	.....	3	1	22	.....	.....	1	66	9,645 26	4,381 24	4,492 82
Prescott	South Plantagenet	7	.....	.....	.....	.....	7	.....	.....	4	.....	840 00	367 50	367 50
	East Hawkesbury	6	.....	.....	.....	.....	6	.....	.....	1	.....	720 00	315 00	315 00
	Longeuil	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	52 50	52 50
	North Plantagenet	9	.....	.....	.....	.....	9	.....	.....	2	.....	1,080 00	472 50	472 50
	Caledonia	4	.....	.....	.....	.....	4	.....	.....	.....	.....	480 00	210 00	210 00
	Alfred	6	.....	.....	.....	.....	6	.....	.....	.....	.....	720 00	315 00	315 00
	*West Hawkesbury	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Hawkesbury, Town	7	.....	.....	2	.....	9	.....	.....	.....	1	3,152 00	1,379 01	1,378 99
	L'Original, Village	3	.....	.....	.....	.....	3	.....	.....	1	1	752 00	329 00	329 00
	Vankleek, Town	4	.....	.....	1	.....	5	.....	.....	.....	2	1,274 00	557 37	557 38
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	47	.....	.....	3	.....	50	.....	.....	8	4	9,138 00	3,997 88	3,997 87

* Local Option. † Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Prince Edward	Picton, Town	5	.....	.....	1	.....	6	1	.....	.....	14	2,152 00	717 34	717 34
	*South Marysburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Wellington, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Sophiasburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hillier	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Ameliasburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Hallowell	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	North Marysburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15 74	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	5	.....	.....	1	.....	6	1	.....	.....	14	2,167 74	717 34	717 34
Rainy River..	Emo	2	.....	.....	.....	.....	2	.....	.....	1	1	302 00	125 84	125 83
	McIrvine	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Chappell	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	50 00	50 00
	Atwood	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Fort Frances, Town	4	.....	.....	1	.....	5	.....	.....	.....	9	1,598 00	665 84	665 83
	Rainy River, Town	3	.....	1	1	.....	5	.....	.....	1	9	1,463 00	609 59	609 58
	Morley	1	.....	.....	.....	.....	1	.....	.....	.....	.....	200 00	83 33	83 34
	Lavallee	3	.....	.....	.....	.....	3	.....	.....	1	.....	360 00	150 00	150 00
	Dilke	2	.....	.....	.....	.....	2	.....	.....	.....	2	404 00	168 33	168 33
	Delhi	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	†Unorganized Districts	2	.....	.....	.....	.....	2	.....	.....	.....	2	244 00	.....	203 33
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	207 36	.....	.....
	Totals	18	.....	1	2	.....	21	.....	.....	3	23	4,898 36	1,852 93	2,056 24

* Local Option. † Payable to Province, less expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Renfrew	Bromley	2	.....	1	....	.....	3	....	....	1	....	300 00	127 50	127 50
	Pembroke, Town	9	.....	1	3	.....	13	....	....	2	15	5,655 00	2,403 38	2,403 37
	Ross	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....
	Westmeath	3	.....	.....	.....	.....	3	....	....	....	.....	360 00	153 00	153 00
	Wilberforce, etc.	1	.....	.....	.....	.....	1	....	....	....	.....	120 00	51 00	51 00
	Petawawa	2	.....	.....	.....	.....	2	....	....	....	.....	240 00	102 00	102 00
	Rolph, Buchanan and Wylie	1	.....	.....	.....	.....	1	....	....	....	.....	120 00	51 00	51 00
	Cobden, Village	2	.....	.....	.....	.....	2	....	....	....	.....	500 00	212 50	212 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....
	Totals	20	.....	2	3	.....	25	....	....	3	15	7,295 00	3,100 38	3,100 37
South Renfrew	Eganville, Village	3	.....	.....	1	.....	4	....	....	1	.....	1,020 00	446 25	446 26
	*McNab	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....
	Renfrew, Town	6	.....	.....	2	.....	8	....	....	3	12	2,824 00	1,235 50	1,235 50
	Grattan	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....
	*Brougham	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....
	Brudenell and Lyndock	2	.....	.....	.....	.....	2	....	....	....	.....	240 00	105 00	105 00
	Arnprior, Town	6	.....	.....	2	.....	8	....	....	....	13	2,826 00	1,236 38	1,236 37
	Radcliffe and Raglan	2	.....	.....	.....	.....	2	....	....	....	.....	240 00	105 00	105 00
	Griffith and Matawachan	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....
	Bagot and Blithfield	2	.....	.....	.....	.....	2	....	....	....	.....	240 00	105 00	105 00
	Admaston	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....
	Jones	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....
	Hagarty, etc.	5	.....	.....	.....	.....	5	1	....	....	.....	630 00	275 63	275 62
	Sebastopol	.....	1 (6 mos.)	.....	.....	.....	1	....	....	....	.....	45 00	19 68	19 69
	Horton	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	....	....	....	.....	.....	.....	.....
	Totals	26	1	.....	5	.....	32	1	.....	4	25	8,065 00	3,528 44	3,528 44

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern. Ordinary.	Tavern. Beer and Wine.	Six months.	Shop.	Club.	Total.	Extensions. Tavern.	Extensions. Shop.	Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
												$ c.	$ c.	$ c.
Russell	Cambridge	2					2					240 00	100 00	100 00
	Russell	6					6					900 00	375 00	375 00
	Clarence	6					6			1		720 00	300 00	300 00
	Gloucester	4				1	5			1		570 00	237 50	237 50
	Cumberland	3					3	1		2		390 00	162 50	162 50
	*Osgoode													
	Rockland Town	4					4			2	2	1,404 00	585 00	585 00
	Casselman, Village	2					2					500 00	208 34	208 33
	Eastview, Town	2					2				1	702 00	292 50	292 50
	Transferred from previous year											143 44		
	Totals	29				1	30	1		6	3	5,569 44	2,260 84	2,260 83
Sault Ste. Marie	Sault Ste. Marie	13				1	14			2	48	5,996 00	2,498 34	2,498 34
	*Korah													
	†Unorganized Districts	1					1					120 00		100 00
	Transferred from previous year											192 82		
	Totals	14				1	15			2	48	6,308 82	2,498 34	2,598 34
St. Catharines	St. Catharines, City	16			2	1	19	3			20	9,465 00	4,448 55	4,448 55
	Transferred from previous year											138 56		
	Totals	16			2	1	19	3			20	9,603 56	4,448 55	4,448 55

* Local Option.

† Payable to Province, less expenses.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartender	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Centre Simcoe.	Barrie, Town	11	.....	.....	1	.....	12	.....	.....	1	23	5,446 00	2,314 55	2,314 60
	Sunnidale	2	.....	.....	.....	.....	2	.....	.....	1	.....	240 00	102 00	102 00
	Flos	4	.....	.....	.....	.....	4	.....	.....	.....	.....	600 00	255 00	255 00
	Tiny	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	51 00	51 00
	Vespra	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	18	.....	.....	1	.....	19	.....	.....	2	23	6,406 00	2,722 55	2,722 60
East Simcoe..	Orillia, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Oro	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Tay	2	.....	.....	.....	.....	2	.....	.....	.....	5	250 00	62 50	62 50
	*Medonte	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Penetanguishene, Town	4	.....	1	1	.....	6	.....	.....	.....	14	1,894 67	473 67	473 66
	Orillia, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Matchedash	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Midland, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	6	.....	1	1	.....	8	.....	.....	.....	19	2,254 67	536 17	536 16

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
South Simcoe.	Adjala	2					2					240 00	66 00	66 00
	Bradford, Village	2					2			1		500 00	137 50	137 50
	*Tecumseth													
	*Innisfil													
	*West Gwillimbury													
	Beeton, Village	2					2	1				562 50	156 25	156 25
	Tottenham, Village	2					2					500 00	137 50	137 50
	Transferred from previous year													
	Totals	8					8	1		1		1,802 50	497 25	497 25
West Simcoe.	Essa	4					4					480 00	210 00	210 00
	*Nottawasaga													
	Stayner, Town	3					3				2	754 00	329 88	329 87
	Collingwood, Town	7			2		9				20	4,090 00	1,792 39	1,792 38
	Tossorontio	2					2	1				270 00	117 75	117 75
	Alliston, Town	3			1		4			1	3	1,476 00	645 68	645 67
	*Creemore, Village													
	Transferred from previous year											87 97		
	Totals	19			3		22	1		1	25	7,157 97	3,095 70	3,095 67

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Stormont	Cornwall, Town	6	.....	.....	2	.....	8	4	.....	2	14	3,928 00	1,391 00	1,391 00
	Cornwall, Township	4	.....	.....	.....	.....	4	2	.....	1	....	520 00	198 00	198 00
	*Osnabruck	.....	.....	.....	.. ..	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Finch	3	.....	.....	.....	.....	3	.....	.....	.....	.....	450 00	152 50	152 50
	Roxborough.....	3	.....	.....	.....	....	3	.....	.....	.....	.....	480 00	176 00	176 00
	Finch, Village	1	.....	.....	.....	.....	1	.....	.....	.....	.....	250 00	87 50	87 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	17	.....	.....	2	.....	19	6	.....	3	14	5,628 00	2,005 00	2,005 00
Sturgeon Falls	Springer	1	.....	.....	.....	.....	1	.....	.....	.....	1	167 00	70 97	70 99
	Caldwell	2	.....	.....	.....	.....	2	.....	.....	.....	1	332 00	141 10	141 10
	Dunnett and Rutter	3	.....	.....	1	.....	4	.....	.....	.....	2	924 00	392 70	392 70
	Sturgeon Falls, Town.....	4	.....	.....	2	.....	6	.....	.....	.....	6	2,412 00	1,025 10	1,025 10
	Martland	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	51 00	51 00
	†Unorganized Territory	1	.....	.....	.....	.....	1	1	.....	.....	.....	144 00	.....	122 40
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	89 44	.....	.....
	Totals	12	.... .	.....	3	.....	15	1	.....	.....	10	4,188 44	1,680 87	1,803 29

*Local Option. †Payable to Province, less expenses.

SCHEDULE B.—Continued.

License District.	Municipality	Tavern.						Extensions				Amount received for licenses in each municipality	Proportion paid to each municipalioy	Proportion received by the Province
		Ordinary.	Beer and Wine.	Six months.	Shop.	Club.	Total.	Tavern.	Shop.	Transfers.	Bartenders.			
												$ c.	$ c.	$ c.
Sudbury	Balfour	2	.....	...	.....	.....	2	.....	.....	1	2	284 00	113 60	113 50
	Blezard	1	.....	.....	.....	.....	1	.....	.....	2	1	122 00	48 80	48 80
	Chapleau	2	.....	.....	.....	.....	2	.....	...	2	1	382 00	152 80	152 80
	Drury, Denison and Graham.....	2	.....	.....	.....	.....	2	1	...	.....	3	433 50	173 40	173 40
	Hagar	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	96 00	96 00
	Hanmer	1	.....	.....	.....	.....	1	.....	.....	.....	1	122 00	48 80	48 80
	Rayside	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	48 00	48 00
	Sudbury	6	...	.....	2	.....	8	.....	.....	1	28	3,156 00	1,262 40	1,262 40
	†Unorganized Territory	3	.....	.....	.....	.....	3	.....	.....	1	2	364 00	.....	291 20
	Refunds	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11 70	.....	.....
	Totals	20	.....	.....	2	...	22	1	.....	7	38	5,235 20	1,943 80	2,235 00
Temiskaming.	New Liskeard, Town	3	.....	.....	1	.....	4	.....	.....	2	10	1,570 00	471 00	471 00
	Haileybury, Town	4	.....	.....	.....	1	5	.....	.....	2	14	2,078 00	623 40	623 40
	Cobalt, Town	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Latchford, Town	1	.....	.....	.....	.....	1	.....	.....	.....	9	268 00	80 40	80 40
	Englehardt, Town	1	.....	.....	.....	.....	1	1	.....	.....	5	843 35	253 01	253 00
	Evanturel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Coleman	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dymond	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Bucke	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dack	1	.....	.....	.....	.....	1	.....	.....	.....	5	130 00	39 00	39 00
	*Harley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	†Unorganized Territory	2	.....	2	.....	.....	4	.....	.....	3	3	366 00	.....	219 60
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Totals	12	.....	2	1	1	16	1	.....	7	46	5,255 35	1,466 81	1,686 40
Toronto	Toronto, City	110	‡1	.....	50	20	181	37	.....	23	394	242,852 45	118,301 00	118,301 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	796 36	.....	.....
	Totals	110	‡1	.....	50	20	181	37	.....	23	394	243,648 81	118,301 00	118,301 00

*Local Option. †Payable to Province, less expenses. ‡ Six months.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East Victoria.	*Omemee, Village													
	Fenelon Falls, Village	3					3					750 00	225 00	225 00
	*Fenelon, Township													
	Bobcaygeon, Village	2					2			1		1,000 00	300 00	300 00
	*Somerville													
	Bexley	2					2					240 00	72 00	72 00
	Digby													
	Verulam													
	Laxton													
	Emily													
	Transferred from previous year													
	Totals	7					7			1		1,990 00	597 00	597 00
West Victoria.	Lindsay, Town	8			1		9			3	18	4,086 00	1,634 40	1,634 40
	*Woodville, Village													
	*Eldon													
	Ops													
	Cardon													
	Dalton													
	*Mariposa													
	Transferred from previous year											117 72		
	Totals	8			1		9			3	18	4,203 72	1,634 40	1,634 40

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Waterloo	Waterloo Tp., N. Part	5					5			1		600 00	279 00	279 00
	Woolwich	5			1		6					800 00	372 00	372 00
	Wellesley	13			1		14			1		1,760 00	818 40	818 40
	Berlin, Town	9			2		11				18	5,536 00	2,574 24	2,574 24
	Waterloo, Town	7			1		8			3	7	2,814 00	1,308 51	1,308 51
	Elmira, Village	3			1		4					1,020 00	474 30	474 30
	Transferred from previous year													
	Totals	42			6		48			5	25	12,530 00	5,826 45	5,826 45
South Waterloo	Galt, Town	7			2		9			2	21	4,092 00	1,964 16	1,964 16
	Preston, Town	5			1		6				5	2,110 00	1,012 80	1,012 80
	Wilmot	10					10					1,200 00	576 00	576 00
	Waterloo Tp., S. Part	3					3	1				390 00	187 20	187 20
	Hespeler, Town	2					2				5	710 00	340 80	340 80
	*North Dumfries					1	1					50 00	24 00	24 00
	New Hamburg, Village	4			1		5			1		1,270 00	609 60	609 60
	Ayr, Village	2					2					500 00	240 00	240 00
	Transferred from previous year											309 28		
	Totals	33			4	1	38	1		3	31	10,631 28	4,954 56	4,954 56

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
Welland	Niagara Falls, City	13	.....	1	4	.....	18	1	.....	2	24	7,960 50	3,781 24	3,781 24
	Crowland	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	57 00	57 00
	Chippawa, Village	2	.....	.....	1	.....	3	.....	.....	1	.....	770 00	365 75	365 75
	Fort Erie, Village	3	.....	.....	1	.....	4	1	.....	.....	.....	1,082 50	514 18	514 19
	Port Colborne, Village	3	.....	1	1	.....	5	.....	.....	.....	.....	1,145 00	543 88	543 87
	Humberstone	8	.....	1	.....	.....	9	.....	.....	1	.....	1,020 00	484 50	484 50
	Stamford	3	.....	.....	.....	.....	3	.....	.....	.....	.....	360 00	171 00	171 00
	Thorold, Township	4	.....	.....	.....	.....	4	.....	.....	.....	.....	480 00	228 00	228 00
	Thorold, Town	3	.....	.....	1	.....	4	.....	.....	2	5	1,410 00	669 75	669 75
	Welland, Town	6	.....	.....	2	.....	8	.....	.....	.....	7	2,814 00	1,336 65	1,336 65
	Willoughby	2	.....	1	.....	.....	3	.....	.....	.....	.....	300 00	142 50	142 50
	Bertie	7	.....	.....	.....	.....	7	.....	.....	2	.....	875 00	415 63	415 62
	Bridgeburg, Village	3	.....	1	.....	.....	4	.....	.....	3	.....	875 00	415 63	415 62
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	552 03	.....	.....
	Totals	58	.....	5	10	.....	73	2	.....	11	36	19,764 03	9,125 71	9,125 69
East Wellington	Mount Forest, Town	5	.....	.....	.....	.....	5	.....	.....	2	7	1,764 00	661 50	661 50
	Elora, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	281 25	281 25
	Nichol	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	Fergus, Village	3	.....	.....	.....	.....	3	.....	.....	.....	.....	750 00	281 25	281 25
	*West Garafraxa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	*Erin, Township	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Arthur, Township	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	West Luther	1	.....	.....	.....	.....	1	.....	.....	.....	.....	120 00	45 00	45 00
	Erin, Village	2	.....	.....	.....	.....	2	.....	.....	.....	.....	500 00	187 50	187 50
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23 93	.....	.....
	Totals	16	.....	.....	.....	.....	16	.....	.....	2	7	4,147 93	1,546 50	1,546 50

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
South Wellington ..	Pilkington	1					1					$ c. 120 00	$ c. 54 00	$ c. 54 00
	Eramosa	3	(1 10 mos.)				3					340 00	153 00	153 00
	Guelph, Township	1					1					120 00	54 00	54 00
	Puslinch	2					2			1		240 00	108 00	108 00
	Guelph, City	15			2	1	18			5	29	8,608 00	3,873 60	3,873 60
	Transferred from previous year											5 01		
	Totals	22			2	1	25			6	29	9,433 01	4,242 60	4,242 60
West Wellington ..	Clifford, Village	2					2			3		500 00	187 50	187 50
	Arthur, Village	3					3					750 00	281 25	281 25
	Harriston, Town	4					4			1	4	1,088 00	408 01	408 00
	Drayton, Village	3					3					750 00	281 25	281 25
	Palmerston, Town	4					4				5	1,090 00	408 75	408 75
	*Maryborough													
	Minto													
	*Peel													
	Transferred from previous year													
	Totals	16					16			4	9	4,178 00	1,566 76	1,566 75
†Windsor	City of Windsor	23			3		26			4	49	13,098 00	5,991 84	5,991 84
	Sandwich	7			1		8			1	9	2,818 00	1,289 22	1,289 22
	Walkerville	3			2		5			1	9	1,768 00	808 76	808 75
	Transferred from previous year											243 53		
	Totals	33			6		39			6	67	17,927 53	8,089 82	8,089 81

* Local Option.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
North Wentworth ..	Dundas, Town	5	1	.....	1	.....	7	.....	.....	.....	8	2,378 50	921 57	921 57
	*Beverley	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	West Flamborough	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	93 00	93 00
	East Flamborough	2	.....	.....	.....	.....	2	.....	.....	.....	.....	270 00	105 47	105 47
	Waterdown, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 00	193 75	193 75
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28 04	.....	.....
	Totals	11	1	.....	1	.....	13	.....	.....	1	8	3,416 54	1,313 79	1,313 79
South Wentworth ..	*Binbrook	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Ancaster	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Saltfleet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Barton	5	.....	.....	.....	1	6	.....	.....	.....	.....	650 00	195 00	195 00
	Glanford	2	.....	.....	.....	.....	2	.....	.....	.....	.....	240 00	72 00	72 00
	Burlington Beach	2	.....	1	.....	1	4	.....	.....	.....	.....	350 00	105 00	105 00
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	55 68	.....	.....
	Totals	9	.....	1	..	2	12	.....	.....	.....	.....	1,295 68	372 00	372 00

* Local Option.

SCHEDULE B.—Continued.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
East York....	Scarborough	4				1	5			1		650 00	227 50	227 50
	*Markham, Township													
	York, east of Yonge St.	7				1	8			1		890 00	311 50	311 50
	Markham, Village	2					2					500 00	175 00	175 00
	*Richmond Hill, Village													
	*North Toronto, Town													
	Transferred from previous year											76 14		
	Totals	13				2	15			2		2,116 14	714 00	714 00
North York...	Aurora, Town	3					3			1	1	752 00	321 74	321 73
	Holland Landing, Village	1					1			1		250 00	108 34	108 33
	North Gwillimbury	2					2			2		240 00	104 00	104 00
	King	5					5			1		650 00	277 34	277 33
	East Gwillimbury	3					3			1		360 00	154 00	154 00
	*Whitchurch													
	Newmarket, Town	3			1		4				8	1,416 00	616 72	616 71
	Georgina	1					1					120 00	52 00	52 00
	*Stouffville, Village													
	Sutton, Village	2	†1				3					593 75	255 73	255 73
	Transferred from previous year											195 64		
	Totals	20	1		1		22			6	9	4,577 39	1,889 88	1,889 83

* Local Option. †6 months.

SCHEDULE B.—Statement by Municipalities, showing the number of Provincial Licenses, etc.—Concluded.

License District.	Municipality.	Tavern.		Six months.	Shop.	Club.	Total.	Extensions		Transfers.	Bartenders.	Amount received for licenses in each municipality	Proportion paid to each municipality	Proportion received by the Province
		Ordinary.	Beer and Wine.					Tavern.	Shop.					
												$ c.	$ c.	$ c.
West York....	York, west of Yonge St.	4	.....	.....	.....	2	6	.....	.....	.....	.....	580 00	120 00	120 00
	*Vaughan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Etobicoke	6	.....	.....	.....	.....	6	.....	.....	3	.....	720 00	153 34	153 33
	Woodbridge, Village	2	.....	.....	.....	.....	2	.....	.....	1	.....	500 02	112 86	112 84
	*Weston, Village	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Transferred from previous year	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44 02	.....	.....
	Totals	12	.....	.....	.....	2	14	.....	.....	4	.....	1,844 04	386 20	386 17
	Grand Totals	1,866	†10	40	245	50	2,211	40	3	315	2,288	906,963 44	399,167 65	402,096 30

*Local Option.

† 3 for 6 months.

SCHEDULE B.—ADDENDA.

Showing amounts collected under Municipal By-Laws for tavern and shop licenses in excess of Statutory Duties.

License District.	Municipality.	Number of Licenses.	Amount of Excess.
Algoma	Blind River	4	$2,000 00
Bruce, North	Albemarle	1	15 00
Brockville	Brockville	11	1,120 00
Dundas	Chesterville	2	20 00
Elgin, East	Port Stanley	2½	25 00
Elgin, West	Aldboro'	1	10 00
	Dutton	2	20 00
Essex, North	Tilbury, N.	2	160 00
Essex, South	Essex	3	60 00
	Tilbury, W.	3	165 00
	Colchester, S.	1	55 00
Fort William	Paipoonge	1	80 00
Glengarry	Charlottenburg	4½	360 00
	Lancaster	2	10 00
	Kenyon	4	20 00
	Lochiel	2	60 00
Halton	Nelson	1	40 00
Hastings, East	Hungerford	2	10 00
Hastings, North	Madoc	2	20 00
Kent, East	Blenheim	3	60 00
	Dresden	2	40 00
	Harwich	2	10 00
Lambton, East	Brooke	1	30 00
	Plympton	1	40 00
Lambton, West	Sombra	5	25 00
	Courtwright	1	150 00
Middlesex, North	Biddulph	2	30 00
Middlesex, West	Glencoe	3	30 00
Nipissing	Mattawa	4	80 00
	Widdifield	1	80 00
Northumberland, East	Percy	2	60 00
Ontario, South	Oshawa	4	80 00
	Whitby Tp.	2	20 00
	Whitby, East	2	20 00
Parry Sound, West	Christie	2	60 00
	Parry Sound	2½	1,125 00
	Foley	1	80 00
Rainy River	Emo	2	60 00
	Fort Frances	4	80 00
	Rainy River	3½	70 00
	Morley	1	80 00
	Dilke	2	160 00
Russell	Gloucester	4	40 00
	Russell	6	180 00
Simcoe, Centre	Flos	4	120 00
Simcoe, West	Alliston	3	450 00
Stormont	Finch	3	90 00
	Roxboro	3	120 00
Sturgeon Falls	Springer	1	45 00
	Caldwell	2	90 00
	Rutter and Dunnett	3	60 00
Sudbury	Balfour	2	40 00
	Chapleau	2	140 00
	Drury, D. and G.	2¼	157 50
Temiskaming	Haileybury	4	600 00
	Englehardt	1	500 00
Victoria, East	Bobcaygeon	2	500 00
Welland	Bertie	7	35 00
Wentworth, North	Flamboro', E.	2	30 00
Wellington, West	Harriston	4	80 00
	Palmerston	4	80 00
York, East	Scarborough	4	120 00
York, North	King	5	50 00

SCHEDULE C.

STATEMENT of the amounts received for Fines and Transfers in each License District for the license year 1909-10.

License District.	Amounts received for Fines.	Amounts received for Transfers.
	$ c.	$ c.
Addington	.....	153 34
Algoma	1,020 00	500 00
Brant, North	70 00	156 66
Brant South	20 00	166 67
Brockville	360 00	40 00
Bruce, Centre	165 00	240 01
Bruce, North	150 00	.....
Bruce, South	225 00	283 35
Carleton	50 00	83 34
Dufferin	29 90	201 00
Dundas	210 00	.....
Durham, East	.....	123 34
Durham, West	.....	.....
Elgin, East	440 00	216 68
Elgin, West	302 00	583 35
Essex, North	1,500 00	240 00
Essex, South	762 70	258 35
Fort William	1,786 00	1,206 69
Frontenac	60 00	40 00
Glengarry	462 05	391 35
Grenville	100 00	123 35
Grey, Centre	65 00	203 33
Grey, North	345 00	.....
Grey, South	67 00	273 34
Haldimand	60 00	246 68
Haliburton	.....	80 00
Halton	120 00	452 01
Hamilton	630 00	700 00
Hastings, East	90 00	196 67
Hastings, North	120 00	123 34
Hastings, West	415 00	533 34
Huron, Centre	250 00	273 33
Huron, North	100 00	239 99
Huron, South	215 00	206 68
Kenora	2,035 00	190 00
Kent, East	460 00	510 02
Kent, West	1,447 00	206 68
Kingston	890 00	333 34
Lambton, East	195 00	166 68
Lambton, West	.....	150 00
Lanark, North	325 00	156 67
Lanark South	180 00	.....
Leeds	82 00	83 35

SCHEDULE C.—Continued.

STATEMENT of the amounts received for Fines and Transfers in each License District for the license year 1909-10.

License District.	Amounts received for Fines.	Amounts received for Transfers.
	$ c.	$ c.
Lennox	65 00	116 67
Lincoln	350 00	40 00
London	300 00	1,166 70
Manitoulin	280 00	246 67
Middlesex, East	110 00	280 00
Middlesex, North	265 00	283 35
Middlesex, West	.....	123 33
Monck	495 00	.....
Muskoka	331 00	506 64
Nipissing	530 00	453 34
Norfolk, North	47 00	40 00
Norfolk, South	10 00	206 68
Northumberland, East	.....	.....
Northumberland, West	10 00	.....
Ontario, North	300 00	83 33
Ontario, South	145 00	470 01
Ottawa	870 00	2,100 01
Oxford, North	392 00	463 34
Oxford, South	285 00	233 34
Parry Sound, East	202 00	246 67
Parry Sound, West	698 50	266 67
Peel	95 00	203 35
Perth, North	995 00	953 30
Perth, South	290 00	236 67
Peterborough, East	.....	.....
Peterborough, West	100 00	333 34
Port Arthur	275 00	166 67
Prescott	1,214 00	363 33
Prince Edward	345 00	.....
Rainy River	425 00	180 00
Renfrew, North	180 00	340 00
Renfrew, South	645 00	433 35
Russell	.....	396 68
Sault Ste. Marie	695 00	300 00
St. Catharines	390 00	.....
Simcoe, Centre	537 00	189 95
Simcoe, East	627 45	.....
Simcoe, South	235 00	83 34
Simcoe, West	100 00	133 35
Stormont	345 00	340 00
Sturgeon Falls	157 00	.....
Sudbury	2,570 00	410 00
Temiskaming	17,186 90	646 68
Toronto	1,580 00	11,733 29
Victoria, East	.....	166 67
Victoria West	154 05	450 00

SCHEDULE C.—Concluded.

STATEMENT of the amounts received for Fines and Transfers in each License District for the license year 1909-10.

License District.	Amounts received for Fines.	Amounts received for Transfers.
	$ c.	$ c.
Waterloo, North	226 00	430 00
Waterloo, South	195 00	383 34
Welland	870 00	928 37
Wellington, East	105 00	233 34
Wellington, South	570 00	913 31
Wellington, West	75 00	340 02
Wentworth, North	40 00	83 33
Wentworth, South	.....	.....
Windsor	2,125 00	900 02
York, East	.....	90 00
York, North	115 00	330 02
York, West	184 20	203 34
Totals	55,135 75	40,554 74

SCHEDULE D.

STATEMENT, showing the amounts paid for expenses of Commissioners, salaries of Inspectors, office rent, postage, stationery, printing, advertising and legal expenses for the license year 1909-10, in each license district.

	$ c.
Addington	905 83
Algoma	1,412 14
Brant, North	647 79
Brant, South	1,054 26
Brockville	626 45
Bruce, Centre	779 92
Bruce, North	857 25
Bruce, South	757 16
Carleton	632 02
Dufferin	718 05
Dundas	776 42
Durham, East	653 64
Durham, West	637 81
Elgin, East	802 63
Elgin, West	1,601 66
Essex, North	1,372 93
Essex, South	905 95
Fort William	620 41
Frontenac	615 56
Glengarry	830 90
Grenville	719 99
Grey, Centre	776 18
Grey, North	1,094 46
Grey, South	711 96
Haldimand	670 21
Haliburton	283 00
Halton	684 07
Hamilton	1,877 50
Hastings, East	853 03
Hastings, North	954 92
Hastings, West	1,206 90
Huron, Centre	1,128 35
Huron, North	828 80
Huron, South	729 46
Kenora	1,121 18
Kent, East	1,370 57
Kent, West	1,466 15
Kingston	1,471 79
Lambton, East	798 22
Lambton, West	1,005 79
Lanark, North	1,058 00
Lanark, South	1,139 70
Leeds	649 12
Lennox	626 56
Lincoln	586 53
London	1,571 47
Manitoulin	809 85
Middlesex, East	900 50
Middlesex, North	1,389 55
Middlesex, West	742 08
Monck	566 55
Muskoka	850 24

SCHEDULE D.—Concluded.

Statement, etc.—*Concluded.*

	$ c.
Nipissing	925 93
Norfolk, North	601 60
Norfolk, South	666 19
Northumberland, East	739 17
Northumberland, West	701 78
Ontario, North	832 36
Ontario, South	901 83
Ottawa	2,544 70
Oxford, North	774 59
Oxford, South	1,011 48
Parry Sound, East	849 58
Parry Sound, West	899 45
Peel	842 29
Perth, North	1,062 14
Perth, South	1,096 34
Peterborough, East	425 71
Peterborough, West	1,167 32
Port Arthur	838 84
Prescott	1,150 12
Prince Edward	639 10
Rainy River	717 03
Renfrew, North	1,087 54
Renfrew, South	1,168 36
Russell	920 50
Sault Ste. Marie	1,193 02
St. Catharines, City	682 34
Simcoe, Centre	973 08
Simcoe, East	976 12
Simcoe, South	801 69
Simcoe, West	858 10
Stormont	1,527 13
Sturgeon Falls	726 05
Sudbury	1,246 41
Temiskaming	2,738 36
Toronto	7,013 37
Victoria, East	706 45
Victoria, West	956 54
Waterloo, North	942 63
Waterloo, South	702 83
Welland	1,374 92
Wellington, East	795 95
Wellington, South	1,212 98
Wellington, West	995 77
Wentworth, North	844 97
Wentworth, South	518 12
Windsor	1,668 85
York, East	707 23
York, North	778 59
York, West	938 97
Total	$102,295 89

RECAPITULATION

OF

RECEIPTS AND EXPENDITURES,

1909–10.

Total Receipts for Licenses, Schedule "B"	$906,963 44	
" " " Fines, " "C"	55,135 75	
" " " Transfers, " "C"	40,554 74	
		$1,002,653 93
Paid to Municipalities, Schedule "B"	$399,167 65	
" Province, " "B"	402,086 30	
" " " "C"	95,690 49	
" for Inspectors' Salaries, Commissioners and Office Expenses, Schedule "D"	102,295 89	
Balances transferred to 1909–10	3,413 60	
		$1,002,653 93

SCHEDULE E.

Giving names and addresses of holders of Distiller's, Brewer's, Brewer's Warehouse, Sample and Wholesale licenses for 1909-10.

Distillers.

Corby, H., Distilling Co., Limited, Belleville.
General Distillery Co., Limited, Toronto.
Gooderham & Worts, Limited, Toronto.
Hamilton Distillery Co., Hamilton.
Maclaren, John A., Estate of, Perth.
Spalding & Stewart, Perth.
Seagram, Joseph E., Waterloo.
Walker & Sons Co., The Hiram, Limited, Walkerville.
Wiser & Sons, The Jos., Limited, Prescott.

Brewers.

Anderton & Co., Barrie.
Andrich, E. C., & Bro., Salem.
Barrie Brewing Co., Barrie.
Bauer, A. (Kuntz & Co.), Waterloo.
Bernhardt, V. P., Preston.
Bixell Brewing and Malting Co., Brantford
Bowie & Co., Brockville.
Brading Brewing Co., Limited, Ottawa.
British American Brewing Co., Limited, Windsor.
Brantford Brewing Co., Limited, Brantford.
Calcutt Brewing and Malting Co., Limited, Peterborough.
Carling Brewing and Malting Co., Limited, London.
Capital Brewing Co., Limited, Ottawa.
Copland Brewing Co., Limited, Toronto.
Cosgrave Brewing Co., Limited, Toronto.
Cornell Brewing and Malting Co., Limited, Lindsay.
Cronmiller & White, Brewing and Malting Co., Limited, Port Colborne.
Devlin, Felix, Stratford.
Dominion Brewing Co., Limited, Toronto.
Egmondville Brewing Co., Egmondville.
Farquarson & Granger, Limited, Walkerton.
Fisher, John, Portsmouth.
Grant Spring Brewing Co., Limited, Hamilton.
Hamilton, Joseph, London.
Heisz, Lawrence, Formosa.
Holliday, W. R., Guelph.
Heuther, C. N., Berlin.
Heuther, W.. Neustadt.
Hamilton Brewing Association, Limited, Hamilton.
Kakabeka Falls Brewing Co., Fort William.
Kemp, D. C., Hornby.
Korman Brewing Co., Limited, Toronto.
Labatt, John, London.
McCarthy, Sons & Co., Limited, Prescott.
New Ontario Brewing Co., Limited, North Bay.
O'Keefe Brewery Co., of Toronto, Limited, Toronto.
Otterbeam, C., Woodstock, 8 months.
Oland, Jno. C., Woodstock, 4 months.
Port Hope Brewing and Malting Co., Limited, Port Hope.
Raw, Mary, New Hamburgh.
Reinhardt & Co., Toronto.
Roy, James A., Belleville.
Rudolph & Begg, St. Thomas.
Schwan, David, Carlsruhe.
Sleeman & Sons, Guelph.
Soo Falls Brewing Co., Limited, Sault Ste. Marie.
Stevenson, Robert, Kingston.
Strathroy Brewing Co., Limited, Strathroy.
Superior Brewing and Malting Co., Limited, Port Arthur.
Schwan, William, Owen Sound.
Sudbury Brewing and Malting Co., Limited, Sudbury.
St. Lawrence Brewery, Limited, Cornwall.
Taylor & Bates, St. Catharines.
Toronto Brewing & Malting Co., Limited, Toronto.
Union Brewing Co., Limited, Sarnia.
Walkerville Brewing Co., Limited, Walkerville.
Watson, John, Listowel.
Wright, Alfred J., Orillia.

Brewers' Warehouses.

Amherstburg	British American Brewing Co.
Barrie	A. Bauer (Kuntz & Co.)
Belleville	C. N. Heuther.
	Grant Spring Brewing Co.
Brockville	Capital Brewing Co., Limited.
	Hamilton Brewing Association, Limited.
Collingwood	O'Keefe Brewery Co., of Toronto, Limited.
	Reinhardt & Co.
Cobourg	O'Keefe Brewery Co., of Toronto, Limited.
	Copland Brewing Co.
	Reinhardt & Co.
Chatham	J. Labatt.
	British American Brewing Co.
Fort William	Reinhardt & Co.
	Soo Falls Brewing Co., Limited.
	Superior Brewing Co., Limited.
Gananoque	Carling, B. & M., Co., of London, Limited.
Guelph	A. Bauer (Kuntz & Co.)
Hamilton	Carling Brewing and Malting Co., of London, Limited.
	Dominion Brewing Co.
	J. Labatt.
	A. Bauer (Kuntz & Co.)
	Reinhardt & Co.
	Cosgrave Brewing Co.
	Walkercille Brewery Co., Limited.
Lindsay	A. Bauer (Kuntz & Co.)
Niagara Falls	Taylor & Bates.

SCHEDULE E.—Concluded.

OTTAWA	Carling Brewing and Malting Co., of London Limited.
	John Labatt.
	O'Keefe Brewery Co., of Toronto, Limited.
	Grant Spring Brewing Co., Limited.
	Copland Brewing Co., Limited.
PERTH	O'Keefe Brewery Co.
PENETANGUISHENE	A. Bauer (Kuntz & Co.)
PARRY SOUND	do.
PORT ARTHUR	Walkerville Brewing Co., Limited.
	Soo Falls Brewing Co.,
	Kakabeka Falls Brewing Co.
	Sudbury Brewing & M. Co., Limited.
SMITH'S FALLS	O'Keefe Brewery Co.
STRATFORD	A. Bauer (Kuntz & Co.)
	C. N. Heuther.
SUDBURY	A. Bauer.
SAULT STE. MARIE	Walkerville Brewing Co., Limited.
	Sudbury Brewing Co.
TORONTO	Carling Brewing and Malting Co., of London, Limited.
	John Labatt.
	Sleeman & Sons.
	Hamilton Brewing Association.
TRENTON	C. N. Heuther.
TILLSONBURG	Rudolph & Begg.
WALLACEBURG	British American Brewing Co., Limited.
WIARTON	W. Heuther.

WHOLESALE LICENSES.**

BERLIN	Randall & Roos.
BRANTFORD	Hamilton, J. S., & Co.
HAMILTON	Turner & Co.
	Scarrone, L. P. (6 mos.)
KINGSTON	Gillespie & Co., of Montreal.
LONDON	Garvey, John.
OTTAWA	Armstrong, T. A.
	Bate, H. N., & Son.
	Grant, Jos.
	Major, S. J., Ltd.
	Morel, T. H.
	Chaput, Fils et Cie., of Montreal.
	Molson, J. H. R., & Bro., of Montreal.
OTTAWA—*Con*	Sevigny, N. J., of Quebec (6 mos.).
	Ross, W. A., & Bro., of New York.
PETERBOROUGH	A. Elliott & Co.
SAULT STE. MARIE	Rotschild, I.
TORONTO	Calvert, J. H.
	Ciceri, Chas. A.
	Distillers Agency Co.
	Edwards, F., & Co.
	Foy & Co., Geo. J.
	Howard, Wilson S.
	Nichol, McConnell & Caplan (6 mos.).
	Perkins, Ince & Co.
	Roblin, D. O.
	Turner Co., The, Ltd.
	Chamband, F., of Montreal.
	Hudon, Hebert & Co., of Montreal.
	Maison, Fournier & F., of Montreal.
	Robertson, J., & Co., Limited, of Montreal.
	St. Charles, F. X., & Co., of Montreal.
	Townsend, S. B., & Co., of Montreal.
	Chard, H. J., & Co., of Montreal.

SAMPLE AND COMMISSION LICENSES (New).

D. M. O'Meara	(L. A. Wilson & Co., Montreal.)
And. Gorrie	(Meagher Bros. & Co., Montreal.)
J. Marcon	(Stroh Brewery Co., Detroit.)
A. W. Hughes	Toronto.
H. M. Stanway	J. Hope & Co., Montreal.)
A. Terroux	(Law, Young & Co., Montreal.)
H. W. Snetsinger	(National Breweries, Montreal.)
A. E. Kennedy	(I. Hirsch & Co., Montreal.)
J. A. Taylor	(J. M. Douglass & Co., Montreal.)
W. C. Wonham	(W. C. Wonham & Sons, Montreal.) 3 mos.
Geo. G. Weir	(Hill Thompson & Co., Montreal.)
W. Mitchell	(Boivin, Wilson & Co., Montreal.)
Colin Campbell	(Montreal.)

**Owing to the new law compelling firms of other provinces and of the United States to take out licenses there is an increase in the number of wholesale licenses issued.

SCHEDULE F.—Showing Statutory Duties payable for tavern, shop and wholesale licenses in the Province of Ontario.

In a city having a population of more than 200,000:

For a tavern license $1,600
For a shop license 1,000

In a city having a population of more than 100,000 and less than 200,000:

For a tavern license $1,200
For a shop license 1,000

In a city having a population of more than 30,000 and not more than 100,000:

For a tavern license $700
For a shop license 700

In a city or town having a population of more than 10,000 and not more than 30,000:

For a tavern license $500
For a shop license 500

In a city having a population of 10,000 or less and in a town having a population of more than 5,000 and not more than 10,000:

For a tavern license $450
For a shop license 450

In a town or incorporated village having a population of more than 2,000 and not more than 5,000:

For a tavern license $350
For a shop license 350

In a town or incorporated village having a population of 2,000 or less:

For a tavern license $250
For a shop license 270

In a township:

For a tavern license $120
For a shop license 200

Provided that in any locality in a Provincial Judicial District other than an incorporated city, town or village there shall be payable:

For a tavern license $120

And provided that in a city, town, village, or other municipality, or a locality without municipal organization in a Provincial Judicial District, there shall be payable:

For a shop license $500

For a beer and wine license a fee of three-fourths of that imposed for a tavern license in the municipality or unorganized district in which the beer and wine license is issued.

For every transfer of a tavern or shop license a fee amounting to one-third of the fee payable for the license transferred.

For each wholesale license $500
For each sample and commission license 300

Provided that the Lieutenant-Governor in Council may increase the duties payable for tavern or shop licenses in any Provincial Judicial District or in any municipality or locality situated therein to such an amount as may be deemed proper, and such increase shall take effect as may be directed by Order-in-Council or from the date of the publication thereof in the *Ontario Gazette*.

SCHEDULE G.

Showing municipalities in which prohibition is in force in 1910.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Addington ...	Kennebec	Tp.	L.O.	1909	308	181	42	139	1	
Algoma	Johnson, Tarbutt, &c.	"	"	1905	296	109	61	48	..	
	MacDonald, Meredith and Aberdeen ...	"	"	1905	249	101	33	68	..	
	Thessalon	"	"	1906	212	77	28	49	..	
	Bruce Mines	Vil.	"	1910	199	86	51	35	2	
Brant, North..	Onondaga	Tp.	"	1907	361	152	91	61	2	Car.'10, mj. 147
	Brantford	"	"	1910	2,137	999	521	478	3	
	Burford	"	"	1910	1,574	728	449	279	2	
	Dumfries, S.	"	"	1910	837	356	234	122	2	
Brant, South..	Oakland	"	"	1910	348	194	91	103	1	
Bruce, Centre.	Huron	"	"	1907	1,019	529	197	332	2	
	Kincardine	"	"	1910	777	407	127	280	1	
	Chesley	Vil.	"	1910	553	267	176	91	3	
Bruce, North..	Amabel	Tp.	"	1906	940	295	219	76	1	Car.'09, mj. 239
	Southampton	Vil.	"	1906	518	233	157	76	2	" " " 48
	Tara	"	"	1906	215	89	76	13	2	" " " 19
	Bruce	Tp.	"	1907	962	300	149	151	1	" '10, " 283
	Arran	"	"	1907	761	372	196	176	1	
	Saugeen	"	"	1907	508	232	153	79	1	
	Eastnor	"	"	1910	468	261	122	139	3	
	Lindsay	"	"	1910	219	84	28	56	..	
Bruce, South..	Teeswater	Vil.	"	1910	286	160	87	73	3	
Carleton	Goulburn	Tp.	"	1907	810	353	212	141	2	
	Huntley	"	"	1907	660	286	112	174	2	
	March	"	"	1907	332	145	88	57	2	Car. '10, mj. 72
	Torbolton	"	"	1910	312	114	75	39	..	
	Nepean	"	"	1910	1,810	709	361	348	..	
	Richmond, W.	Vil.	*	....	.....	.....	.....	.....	..	
Dufferin	Amaranth	Tp.	"	1894	878	215	80	135	1	Car.'09, mj. 236
	E. Garafraxa	"	"	1895	618	201	157	44	1	" '07, " 100
	E. Luther	"	"	1893	639	311	186	125	2	
	Melancthon	"	"	1898	1,145	413	234	179	2	
	Mulmur	"	"	1908	1,020	461	198	263	2	
	Mono	"	"	1910	.....	509	112	397	..	
	Orangeville	Town.	"	1910	830	383	250	133	6	
	Shelburne	Vil.	"	1910	365	203	112	91	3	
Dundas	Mountain	Tp.	"	1906	411	286	125	161	2	Car.'09, mj. 290
	Winchester	Vil.	"	1907	374	198	83	115	2	
	Iroquois	"	"	1909	376	183	94	89	2	
Durham, East.	Cavan	Tp.	"	1905	1,015	256	71	185	2	
	Hope	"	"	1906	.....	358	307	51	1	
	Manvers	"	"	1907	1,118	529	213	316	2	
	Millbrook	Vil.	"	1908	327	202	82	120	3	
Durham, West.	Clarke	Tp.	"	1905	1,368	641	189	452	2	
	Cartwright	"	"	1904	559	284	111	173	1	
	Darlington	"	"	1900	1,295	438	73	365	1	
	Bowmanville	Town.	"	1909	908	456	233	223	3	
Elgin, East ..	Yarmouth	Tp.	"	1905	1,770	663	508	155	4	Car.'08, mj. 240
	Malahide	"	"	1909	1,280	662	241	421	..	
Elgin, West ..	Southwold	"	"	1906	1,348	536	315	221	4	
	Dunwich	"	"	1910	1,200	481	300	181	2	
Essex, North..	Sandwich, South ...	"	"	1910	515	254	111	143	2	
Essex, South..	N. Colchester	"	D.A.	....	.....	.....	.....	.....	..	
	S. Gosfield	"	L.O.	1907	658	313	173	140	1	B. and W.
	Mersea	"	"	1907	1,373	646	319	327	1	

* Part of Goulburn Township when L.O. carried.

SCHEDULE G.—*Continued.*

Showing municipalities in which prohibition is in force in 1910.—Continued.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Essex, South— (Con.)	Tilbury, W.	Tp.	L.O.	1910	514	264	166	98	3	
	Colchester, S.	"	"	1910	823	410	173	237	1	
	Kingsville	Town	"	1910	491	257	140	117	2	
	Leamington	"	"	1910	822	444	213	231	3	
Frontenac	Kingston	Tp.	"	1906	1,040	349	301	48	5	
	Storrington	"	"	1892	614	233	195	38	3	
	Portland	"	"	1907	926	433	189	244	3	Car.'10, mj. 295
	Pittsburgh	"	"	1908	775	275	174	101	3	
Glengarry	Charlottenburgh	"	"	1910	1,390	573	362	211	5	
Grenville	Cardinal	Vil.	"	1905	314	121	117	7	2	Car.'08, mj. 177
	Oxford	Tp.	"	1910	975	414	255	159	2	
	Augusta	"	"	1910	1,200	491	308	183	2	
Grey, Centre	Euphrasia	"	"	1905	1,218	332	276	56	1	
	Artemesia	"	"	1906	1,148	521	212	309	6	
	Collingwood	"	"	1906	1,127	394	313	81	..	" " " 249
	Osprey	"	"	1906	1,003	379	273	106	2	
	Thornbury	Town	"	1906	278	120	89	31	2	" '09 " 49
	Holland	Tp.	"	1910	1,049	397	224	173	2	
Grey, North	Sarawak	"	D.A.	....	.....	.....	.....	.....	..	
	Derby	"	L.O.	1906	632	335	80	255	..	
	Keppel	"	"	1906	1,134	441	161	355	2	
	Owen Sound	Town	"	1906	2,300	1,238	762	438	13	" " " 186
	Sydenham	Tp.	"	1906	1,170	686	238	448	3	
Grey, South	Egremont	"	"	1906	995	504	206	298	1	" " " 360
	Proton	"	"	1907	827	456	227	229	3	
	Durham	Town	"	1908	666	297	179	118	3	
	Dundalk	Vil.	"	1910	264	132	85	47	3	
	Bentinck	Tp.	"	1910	1,048	377	234	143	2	
Haliburton	Dysart	"	"	1910	370	162	78	84	1	
Haldimand	Seneca	"	"	1909	600	317	170	147	2	
Halton	Nassagaweya	"	"	1906	686	330	156	174	1	
	Trafalgar	"	"	1906	1,176	272	174	98	1	
	Nelson	"	"	1910	1,112	463	175	288	..	
	Acton	Vil.	"	1910	481	235	139	96	3	
Hastings, East	Tweed	"	"	1909	413	213	124	89	4	
	Thurlow	Tp.	"	1909	1,600	705	443	162	4	
Hastings, N.	Huntingdon	"	"	1906	790	416	149	267	..	Car. '07, mj. 75
	Madoc	"	"	1902	.....	432	195	237	2	
	Rawdon	"	"	1902	.....	272	169	103	3	
	Stirling	Vil.	"	1908	283	151	86	65	3	
	Limerick	Tp.	"	1909	117	45	5	40	1	
	Tudor	"	"	1909	252	117	61	56	1	
	Wollaston	"	"	1909	213	128	21	107	1	
	Faraday	"	"	1910	234	101	49	52	..	
	Dungannon	"	"	1910	247	102	54	48	1	
Hastings, West	Sidney	"	"	1909	1,633	855	322	533	4	
Huron, Centre	Colborne	"	"	1910	600	307	178	129	2	
	Hullett	"	"	1905	894	357	349	8	2	Car.'08, mj. 198
	Wawanosh, E.	"	"	1906	565	158	88	70	1	
	Ashfield	"	"	1909	1,009	512	266	246	4	
Huron, North	Grey	"	"	1910	1,060	514	202	312	4	
Huron, South	Stanley	"	"	1907	611	288	118	170	2	
	Usborne	"	"	1907	702	352	178	174	1	
	Tuckersmith	"	"	1910	715	305	197	108	2	
Kent, East	Camden	"	"	1905	886	295	252	43	1	Car.'08, mj. 116
	Orford	"	"	1910	956	487	247	240	1	

SCHEDULE G.—*Continued.*

Showing municipalities in which prohibition is in force in 1910.—Continued.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Kent, West ..	Raleigh	Tp.	L.O.	1904	1,645	522	463	59	2	Car. '07, mj. 113
	Tilbury, E.	"	"	1891	889	323	152	171	4	
Lambton, East	Arkona	Vil.	"	1906	170	72	49	23	2	" '09, " 14
	Euphemia	Tp.	"	1906	650	243	225	17	3	" " " 245
	Warwick	"	"	1906	1,049	471	189	282	..	
	Wyoming	"	"	1909	242	132	65	67	3	
	Brooke	"	"	1910	1,088	541	214	327	1	
Lambton, West	Dawn	"	"	1905	.....	371	300	71	1	
	Enniskillen	"	"	1906	650	243	226	17	4	
	Moore	"	"	1906	1,483	586	455	131	8	Car. '09, mj. 300
	Sarnia	"	"	1906	749	351	147	204	1	
Lanark, North	Lanark	"	"	1890	449	149	42	107	2	" '07 " 336
	Dalhousie	"	"	1906	508	249	124	125	1	
	Almonte	Town	"	1910	781	327	187	140	4	
	Beckwith	Tp.	"	1910	496	208	65	143	1	
	Pakenham	"	"	1910	510	274	140	134	3	
	Ramsey	"	"	1910	688	332	173	159	..	
Lanark, South	S. Sherbrooke	"	"	1907	260	107	59	48	1	
Leeds	Leeds & Lansdowne, Front	"	"	1900	1,203	411	338	73	1	
	Leeds & Lansdowne, Rear	"	"	1910	729	361	214	147	2	
	Athens	Vil.	"	1909	438	264	95	169	2	
Lennox	Richmond	"	"	1907	824	401	145	256	1	
	Ernestown	Tp.	"	1910	1,105	519	320	199	3	
Lincoln	Niagara	"	"	1904	734	224	208	16	3	Car. '10, mj. 53
	Beamsville	Vil.	"	1906	.....	109	103	6	3	" '07 " 31
	Grimsby, N.	Tp.	"	1906	653	202	101	101	..	" '10 " 48
	Grimsby, S.	"	"	1906	518	179	149	30	2	" '10 " 142
	Clinton	"	"	1906	.....	265	70	195	..	" '09 " 31
Manitoulin ...	Tehkummah	"	"	1900	103	54	22	32	..	
Middlesex, E..	Nissouri, W.	"	"	1907	890	415	203	212	3	
	Dorchester, N.	"	"	1910	1,184	554	354	200	4	
	Westminster	"	"	1910	1,870	824	482	342	3	
Middlesex, N..	E. Williams	"	"	1905	619	193	168	25	2	
	Adelaide	"	"	1910	750	425	157	268	2	
	Ailsa Craig	Vil.	"	1910	243	146	58	88	2	
	Strathroy	Town	"	1910	1,010	477	309	168	5	
Middlesex, W..	Caradoc	Tp.	"	1909	1,148	605	297	308	3	
	Lobo	"	"	1910	1,050	409	237	172	2	
Monck	Gainsboro'	"	"	1893	893	385	202	183	2	
	Pelham	"	D.A.	....	.....	.....	.....	.....	..	Car. '07, mj. 332
	Caistor	"	L.O.	1908	571	270	114	156	1	
	Wainfleet	"	"	1910	1,013	419	204	215	1	
Muskoka	McLean and Ridout.	"	"	1904	229	74	59	15	2	" '07 and 10
	Morrison	"	"	1906	.....	111	35	76	1	
	Port Carling	Vil.	"	1907	130	50	28	22	1	" '10, mj. 2
	Brunel	Tp.	"	1908	150	100	26	74	..	
Nipissing	Dymond	"	"	1907	175	46	20	26	..	
	Jocelyn	"	"	1907	208	61	15	46	..	
Norfolk, North	Windham	"	"	1905	1,221	402	220	182	3	
	Waterford	Vil.	"	1907	367	168	98	70	3	
Norfolk, South	Walsingham, N.	Tp.	"	1907	598	239	90	149	2	

SCHEDULE G.—*Continued.*

Showing municipalities in which prohibition is in force in 1910.—Continued.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
N'mberland, E.	Cramahe	Tp.	L.O.	1907	1,026	525	218	307	1	
	Murray	"	"	1908	1,070	577	196	381	2	
	Seymour	"	"	1908	1,176	521	107	414	1	
	Brighton	Vil.	"	1908	641	316	150	166	2	
	Colborne	"	"	1908	407	206	101	105	3	
	Campbellford	Town.	"	1908	798	372	241	131	4	
N'mberland, W	Haldimand	Tp.	"	1906	1,412	473	386	87	1	
	S. Monaghan	"	"	1906	298	101	6	95	1	
	Hamilton	"	"	1908	1,284	575	273	302	5	
Ontario, North	Scott	"	"	1906	748	251	214	37	2	
	Uxbridge	"	"	1910	1,021	420	237	183	3	
Ontario, South	Reach	"	"	1899	1,223	272	174	98	3	
	Pickering	"	"	1906	1,752	694	489	205	5	Car. '09, mj. 320
	Whitby	"	"	1910	680	306	195	111	2	
Oxford, North.	E. Nissouri	"	"	1906	899	338	311	27	1	
	Blenheim	"	"	1910	1,376	704	331	373	4	
Oxford, South.	E. Oxford	"	"	1905	693	243	194	49	1	
	N. Oxford	"	"	1906	411	177	149	28	2	Car. '09, mj. 132
	Norwich, S.	"	"	1907	825	333	215	118	2	
	Norwich	Vil.	"	1908	408	217	122	95	3	
P'ry Sound, W.	McDougall	Tp.	"	1891	130	30	9	21	..	" '07, " 6
	McKellar	"	"	1908	.....	70	33	37	..	
Peel	Chinguacousy	"	"	1907	1,213	480	308	172	2	
	Albion	"	"	1910	936	440	283	157	3	
	Caledon	Tp.	"	1910	1,388	627	408	219	5	
Perth, South..	Fullerton	"	"	1907	701	346	172	174	1	
	Downie	"	"	1910	908	417	249	168	3	
Peterboro', E..	Dummer	"	"	1906	658	288	126	162	1	
	Otonabee	"	"	1906	1,011	376	181	195	1	
	Asphodel	"	"	1908	584	289	147	142	1	
	Norwood	"	"	1908	299	178	63	115	2	
	Havelock	Vil.	"	1909	485	217	86	131	3	
Peterboro', W.	Smith	Tp.	"	1905	900	429	271	158	4	
	Lakefield	Vil.	"	1906	391	182	141	41	2	Car. '09, mj. 61
	Harvey	Tp.	"	1908	389	203	83	120	..	
Port Arthur ..	Oliver	Vil.	"	1892	.....	51	11	40	..	
	Schreiber	Tp.	"	1908	162	63	36	27	2	
Prescott	W. Hawkesbury	"	"	1898	350	98	64	34	5	
Prince Edward	Hallowell	"	D.A.	1866	....	.....	....	....	..	
	S. Marysburgh	"	L.O.	1897	531	211	77	134	2	
	Ameliasburgh	"	"	1906	953	295	219	76	1	
	Sohpiasburgh	"	"	1906	749	253	100	153	1	
	Hillier	"	"	1909	579	320	120	200	1	
	Wellington	Vil.	"	1909	334	170	105	65	2	
	Bloomfield	" *	D.A.	....	.....	.....	....	....	..	
Renfrew, N...	Cobden	"	L.O.	1910	219	102	61	41	2	
	Westmeath	Tp.	"	1910	884	443	85	358	3	
Renfrew, S....	McNabb	"	"	1906	970	340	184	156	3	Car. '09, mj, 411
	Brougham	"	"	1909	110	47	25	22	2	
	Renfrew	Town	"	1910	851	371	232	139	8	
Russell	Osgoode	"	"	1906	1,443	597	349	248	5	
S. Ste. Marie..	Sault Ste. Marie	"	"	1891	500	67	52	15	3	Shops only.
	Korah	Tp.	"	1905	750	300	200	100	..	
Simcoe, Centre	Sunnidale	"	"	1910	750	374	168	206	1	

*Part of Hallowell Tp. when D.A. was carried.

SCHEDULE G.—*Concluded.*

Showing municipalities in which prohibition is in force in 1910.—Concluded.

License District.	Municipality.	Status.	Dunkin Act or Local Option.	Year of passing.	No. of voters on list.	Vote for.	Against.	Majority for.	No. of licenses cut off	Remarks.
Simcoe, East..	Oro	Tp.	L.O.	1906	1,099	423	142	281	1	
	Midland	Town	"	1907	940	477	234	243	5	
	Orillia	"	"	1907	1,302	585	219	316	..	Shops only.
	Medonte	Tp.	"	1908	1,089	544	273	271	6	
	Orillia	Town	"	1910	1,489	715	440	275	..	
	Coldwater	Vil.	*	....	.....	.....	....	.....	..	
Simcoe, South	Bolton	"	"	1906	.....	101	90	11	2	
	Tecumseh	Tp.	"	1907	1,138	474	288	186	2	
	W. Gwillimbury	"	"	1907	786	335	145	190	..	
	Innisfil	"	"	1907	1,238	513	233	280	3	Car.'10, mj. 457
	Beeton	Vil.	"	1910	234	121	59	62	2	
	Tottenham	"	"	1910	223	111	70	41	2	
Simcoe, West.	Nottawasaga	Tp.	"	1902	1,807	635	455	170	2	" '09, " 352
	Creemore	Vil.	"	1908	228	120	57	63	2	
	Collingwood	Town	"	1910	2,109	918	557	361	9	
	Alliston	"	"	1910	421	213	137	76	4	
	Stayner	"	"	1910	374	178	109	69	3	
	Essa	Tp.	"	1910	1,146	513	241	272	4	
	Tossorontio	"	"	1910	529	254	152	102	2	
Stormont	Osnabruck	"	"	1906	1,575	536	434	102	7	" " " 200
	Finch	Vil.	"	1910	158	72	43	29	1	
Temiskaming .	Harley	Tp.	"	1907	182	29	13	16	..	
Victoria, East.	Fenelon	"	"	1904	.....	231	97	134	2	" " " 345
	Omemee	Vil.	"	1908	192	97	55	42	2	
	Somerville	Tp.	"	1908	553	226	137	89	2	
	Bobcaygeon	Vil.	"	1910	325	158	74	84	2	
Victoria, West	Mariposa	Tp.	"	1892	1,399	397	394	73	..	Repeal de-
	Eldon	"	"	1908	861	387	208	179	5	feated 1898
	Woodville	Vil.	"	1908	147	75	38	37	1	and 1902.
Waterloo, S. ..	N. Dumfries	Tp.	"	1907	725	312	160	152	2	
	Galt	Town	"	1910	2,718	1,337	878	459	9	
Wellington, E.	W. Garafraxa	Tp.	"	1905	850	302	235	67	2	Carried in '93,
	Erin	"	"	1908	1,120	499	292	207	4	'98 and 1905.
	Luther, W.	"	"	1910	637	250	127	123	1	
Wellington, S .	Eramosa	"	"	1910	793	378	209	169	3	
Wellington, W.	Maryborough	"	"	1905	848	453	255	198	3	
	Peel	"	"	1906	1,100	438	314	124	4	Car.'09. mj. 18
Wentworth, N.	Beverly	"	"	1908	1,265	611	288	323	2	
Wentworth, S.	Binbrook	"	"	1899	408	185	87	98	1	
	Ancaster	"	"	1908	1,235	579	388	221	4	
	Glanford	"	"	1910	527	263	136	127	2	
York, East ...	Markham	"	"	1906	1,525	624	430	194	5	Car.'09, mj. 139
	Richmond Hill	Vil.	"	1906	213	99	78	21	..	" " " 191
York, North...	Whitchurch	Tp.	"	1905	1,225	366	191	175	1	" " " 321
	Stouffville	Vil.	"	1906	475	221	122	99	2	" " " 80
	Gwillimbury, E.	Tp.	"	1910	1,227	658	266	392	2	
	Newmarket	Town	"	1910	932	492	253	239	4	
York, West ...	Toronto Junction ..	"	"	1904	2,600	869	679	190	7	Car.'07, mj. 337
	Weston	Vil.	"	1907	469	227	148	79	3	
	Vaughan	Tp.	"	1906	.....	459	373	86	7	" '09, " 170
	North Toronto	Town	"	1905	.....	268	243	25	3	" '08, " 111

*Part of Medonte Township when Local Option carried.

SCHEDULE H.

STATEMENT showing number of convictions and dismissals of cases, for infraction of the Liquor License Act, against licensees and others, during the license year 1909-10.

(This statement does not include Local Option cases, which appear in Schedule K.)

License District.	Against Licensees.		Against Non-licensees.	
	No. of Convictions.	No. of Dismissals.	No. of Convictions.	No. of Dismissals.
Addington	1	.....	1	.....
Algoma	5	7	33	7
Brant, North	5	3	.....	.....
Brant, South	.....	.....	1	.....
Brockville	5	1	6	.....
Bruce, Centre	1	2	10	1
Bruce, North	3	6	7	11
Bruce, South	3	.....	11	1
Carleton	1	.....	.....	.....
Dundas	2	11	3	1
Durham, West	4	2	.....	.....
Elgin, East	1	.....	1	4
Elgin, West	.....	3	43	6
Essex, North	29	7	6	3
Essex, South	11	.....	12	1
Fort William	9	.....	26	1
Frontenac	1	.....	3	.....
Glengarry	5	2	20	5
Grenville	3	2	9	3
Grey, Centre	1	1	8	.....
Grey, North	1	.....	23	12
Grey, South	5	.....	8	2
Haldimand	3	1	.....	.....
Halton	.....	1	7	1
Hamilton	1	1	5	1
Hastings, East	3	1	2	.....
Hastings, North	1	2	6	1
Hastings, West	2	5	5	.....
Huron, Centre	7	1	5	.....
Huron, North	1	.....	1	.....
Huron, South	2	.....	9	.....
Kenora	9	6	12	1
Kent, East	6	3	45	10
Kent, West	24	11	63	14
Kingston	8	3	38	5
Lambton, East	3	3	4	1
Lambton, West	3	1	1	1
Lanark, North	3	3	12	6
Lanark, South	2	3	11	6
Leeds	1	.....	4	3
Lennox	.....	1	7	5
Lincoln	1	.....	4	.....
London	5	4	5	2
Manitoulin	3	3	3	1
Middlesex, East	3	.....	1	2
Middlesex, North	2	4	16	4
Middlesex, West	.....	2	.....	.....
Monck	3	.....	22	.....

SCHEDULE H.—*Concluded.*

Statement showing number of cases prosecuted, etc.—*Concluded.*

License District.	Against Licensees.		Against Non-licensees.	
	No. of Convictions.	No. of Dismissals.	No. of Convictions.	No. of Dismissals.
Muskoka	3	.....	19	6
Nipissing	2	.....	6	2
Norfolk, North	4	2	3	1
Northumberland, East	6	.....	.....	.....
Northumberland, West	.....	1	1	.....
Ontario, North	2	1	14	4
Ontario, South	1	2	14	.....
Ottawa	3	4	.....	.....
Oxford, North	7	.....	1	1
Oxford, South	.....	3	22	3
Parry Sound, East	4	.....	16	5
Parry Sound, West	2	.....	29	3
Peel	3	4	2	4
Perth, North	9	2	.....	.....
Perth, South	10	4	11	1
Peterborough, East	.....	.....	2	1
Peterborough, West	2	1	14	3
Port Arthur	5	.....	8	1
Prescott	36	5	19	2
Prince Edward	.....	.....	16	8
Rainy River	11	1	4	2
Renfrew, North	1	2	21	2
Renfrew, South	9	4	20	3
Russell	2	.....	1	1
St. Catharines	1	1	4	.....
Sault Ste. Marie	53	.....	16	.....
Simcoe, Centre	6	3	13	.....
Simcoe, East	3	2	12	3
Simcoe, South	2	.....	16	1
Simcoe, West	3	4	9	.....
Stormont	2	.....	12	2
Sturgeon Falls	3	1	2	.....
Sudbury	5	.....	25	.....
Temiskaming	5	.....	309	23
Toronto	1	1	36	39
Victoria, East	.....	1	1	.....
Victoria, West	3	2	20	2
Waterloo, North	.....	2	1	.....
Waterloo, South	6	2	3	.....
Welland	7	1	15	1
Wellington, East	1	.....	8	.....
Wellington, South	19	10	31	4
Wellington, West	.....	2	7	1
Wentworth, North	1	.....	.....	1
Windsor	25	12	4	3
York, North	1	.....	11	.....
York, West	.....	.....	4	.....
Totals	404	186	*1,396	255

*Included in the number of prosecutions against unlicensed persons are 856 cases against persons who were prohibited under Sec. 125 of the Act from obtaining liquor (inebriates) and of persons supplying such persons. There were 715 convictions and 141 dismissals in this class.

SCHEDULE I.

Statement showing number of convictions and dismissals of cases for violation of Local Option By-laws during the license year, 1909-10.

Municipality.	License District.	No. of Convictions.	No. of Dismissals.
Kennebec	Addington	1	
Athens	Brockville	1	1
Huron	Bruce Centre	4	
Amabel	" North	1	1
Saugeen	" "	1	
Southampton	" "	2	1
Tara	" "	3	1
Iroquois	Dundas		1
Mountain	"		3
Bowmanville	Durham West	2	1
Kingston, Tp.	Frontenac	1	
Pittsburgh	"	2	
Portland	"		1
Cardinal	Grenville	1	
Collingwood, Tp.	Grey, Centre		1
Artemesia	" "	5	2
Thornbury	" "		2
Owen Sound	" North	37	34
Durham	" South	1	2
Egremont	" "	1	
Proton	" "	5	
Thurlow	Hastings East	2	
Tweed	" "	3	
Stirling	" North	1	
Sidney	" West	3	1
Raleigh	Kent West	1	1
Euphemia	Lambton East	1	
Wyoming	" "	2	
Moore	" West	2	
Niagara	Lincoln	1	
Caistor	Monck	1	
Port Carling	Muskoka	3	2
Waterford	Norfolk, North	3	
Brighton	Northumberland, East	3	2
Campbellford	" "	4	
Colborne	" "	4	4
Reach	Ontario, South	2	2
Lakefield	Peterborough, East	1	1
Norwood	" "	1	
Harvey	" West		3
Midland	Simcoe, East	2	
Creemore	" West	3	1
Osnabruck	Stormont	6	
Somerville	Victoria, East	1	3
Eldon	" West	1	
North Dumfries	Waterloo, South	1	
Beverly	Wentworth, North	1	
Ancaster	" South	4	2
North Toronto	York, East	1	
Stouffville	" "	1	
Whitchurch	" North	1	
Vaughan	" West	1	
Totals		130	73

A table sl

Name of gaol.	
Barrie	
Berlin	
Belleville	
Brantford	
Brampton	
Brockville	
Bracebridge	
Cayuga	
Cornwall	
Cobourg	
Chatham	
Fort Frances	
Goderich	
Guelph	
Gore Bay	
Hamilton	
Kingston	
Kenora	
London	
Lindsay	
L'Orignal	
Milton	
Napanee	
North Bay	
Ottawa	
Owen Sound	
Orangeville	
Perth	
Picton	
Pembroke	
Peterborough	
Port Arthur	
Parry Sound	
Simcoe	
St. Catharines	
Sarnia	
Stratford	
Sandwich	
St. Thomas	
Sault Ste. Marie	
Sudbury	
Toronto	
Walkerton	
Woodstock	
Welland	
Whitby	
Lock-ups:	
Atikokan	
Burk's Falls	
Byng Inlet	
Cobalt	
Killarney	
Manitowaning	
Mine Centre	
Webbwood	
Totals	3

SCHEDULE J

A table showing the number of commitments to each gaol for drunkenness during the years 1885 to 1910, both inclusive. The figures for 1909 and 1910 are compared, and the increase or decrease in each place is shown.

Name of gaol	1885	1886.	1887.	1888	1889.	1890.	1891.	1892.	1893.	1894.	1895	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904	1905.	1906.	1907.	1908.	1909.	1910.	Increase 1910.	Decrease 1910	Name of gaol.
Barrie.	11	35	16	28	46	34	34	19	10	21	9	24	21	11	10	14	12	21	14	16	27	46	56	39	29	59	30	.....	Barrie.
Berlin	7	4	8	12	20	17	13	4	6	7	7	10	12	10	7	4	4	11	15	10	17	18	9	19	16	13	.....	2	Berlin.
Belleville	45	34	53	47	39	49	54	18	24	25	19	19	12	13	16	12	11	20	6	12	6	15	24	67	23	61	38	.....	Belleville.
Brantford.	28	91	112	147	218	162	112	89	120	125	124	106	118	85	64	89	74	92	130	102	143	153	239	176	148	122	.....	26	Brantford.
Brampton	24	9	19	24	25	30	17	.....	9	9	11	9	2	3	4	4	4	5	3	4	6	10	5	1	5	1	.....	4	Brampton.
Brockville	60	36	24	81	58	58	44	44	77	68	76	43	48	49	45	41	58	68	65	50	66	91	88	83	40	64	14	.....	Brockville.
Bracebridge	67	7	7	3	25	15	19	6	5	6	4	4	3	2	3	.....	5	6	9	6	13	7	6	9	6	6	.....	.....	Bracebridge
Cayuga	18	15	17	24	25	15	23	7	.....	5	6	6	9	10	13	10	15	12	15	18	17	14	7	7	12	32	16	.....	Cayuga.
Cornwall	3	1	4	7	29	36	14	22	27	10	24	8	11	23	31	13	12	15	18	17	14	7	7	12	32	16	.....	16	Cornwall.
Cobourg	26	15	6	12	24	18	23	26	14	12	18	14	12	15	26	10	16	14	12	12	7	15	21	10	27	36	9	.....	Cobourg.
Chatham	13	14	7	9	61	71	47	26	28	22	67	9	13	13	15	18	18	11	9	5	16	16	27	28	30	36	6	.....	Chatham.
Fort Frances	.....	.....	.....	4	2	5	5	2	3	3	.....	.....	2	1	2	5	5	4	9	5	14	5	1	3	18	5	.....	13	Goderich.
Goderich	3	4	.....	4	2	5	5	14	9	23	17	7	9	9	3	13	4	13	4	6	12	7	6	4	6	10	5	.....	Guelph.
Guelph	12	12	22	21	10	10	4	1	2	1	2	3	.....	.....	.....	.....	1	5	5	.....	.....	6	2	7	2	.....	.....	2	Gore Bay
Gore Bay	.....	.....	4	3	1	4	1	2	1	2	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Hamilton.
Hamilton	268	335	173	428	401	418	251	142	148	58	56	60	58	60	66	96	108	97	108	229	287	290	394	340	415	479	64	.....	Hamilton.
Kingston	58	58	109	107	159	120	125	57	102	78	89	49	51	50	48	31	47	40	58	62	59	54	68	64	63	109	20	.....	Kingston.
Kingston	77	53	56	73	74	46	60	31	75	65	31	76	26	111	110	83	54	58	37	21	10	19	38	93	83	6	.....	27	Kenora.
London	277	338	404	405	540	382	215	150	210	212	167	177	159	133	178	157	157	230	157	202	249	248	318	325	424	325	.....	99	London.
Lindsay	30	1	1	4	3	6	1	5	2	5	2	2	2	2	2	2	2	3	1	3	4	2	4	11	6	12	4	.....	Lindsay
L'Orignal	3	1	.....	2	.....	5	1	3	1	3	3	1	3	2	.....	2	4	4	4	8	10	2	6	11	6	1	.....	1	L'Orignal.
Milton	3	1	.....	.....	.....	3	5	1	3	4	3	3	3	4	2	4	4	4	8	10	7	11	6	8	8	7	.....	1	Milton.
Napanee	9	13	5	19	13	9	9	6	4	8	9	8	6	13	4	7	4	7	8	5	8	13	13	10	21	16	.....	3	Napanee
North Bay	6	3	6	7	4	22	23	12	9	20	8	6	5	13	7	4	3	12	5	73	39	171	73	103	48	28	40	2	.....	North Bay
Ottawa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Ottawa.
Owen Sound	245	250	286	297	270	326	264	182	105	111	157	152	165	157	185	224	293	241	267	247	338	267	358	426	380	408	28	.....	Owen Sound.
Orangeville	36	27	21	29	37	17	13	14	11	6	.....	8	6	13	7	8	12	16	13	10	6	6	10	13	18	41	20	.....	Orangeville.
Parry Sound	1	3	3	1	4	2	1	2	.....	.....	.....	.....	.....	1	.....	3	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	Parry Sound.
Perth	6	4	9	4	2	5	6	3	2	3	6	2	2	7	9	7	12	17	34	20	9	30	24	27	17	19	2	.....	Perth
Picton	41	54	20	45	38	33	19	31	11	21	11	22	31	23	30	38	19	21	18	16	28	23	21	42	26	33	8	.....	Picton
Pembroke	12	2	2	.....	6	1	.....	5	2	4	7	3	6	5	.....	1	4	4	7	1	6	7	8	11	20	7	.....	13	Pembroke.
Peterborough	25	13	11	16	20	45	24	22	16	15	13	16	11	11	10	6	15	9	14	23	15	24	56	22	27	23	.....	6	Peterborough.
Port Arthur	60	30	28	16	18	12	6	3	4	4	3	5	7	2	7	3	5	8	7	60	25	27	67	144	185	209	185	14	Port Arthur.
Parry Sound	.....	.....	1	1	10	9	.....	.....	4	5	7	2	7	3	5	8	4	5	26	10	85	153	69	99	28	28	3	.....	Parry Sound.
Simcoe	4	6	5	3	17	3	16	6	3	11	17	6	6	16	10	11	6	18	11	15	13	15	56	50	27	27	.....	.....	Simcoe.
St. Catharines	24	31	21	29	33	23	12	9	21	17	26	25	6	17	19	15	35	21	28	20	33	20	30	25	43	42	.....	1	St. Catharines
Sarnia	5	72	36	44	99	118	95	27	36	69	116	57	62	49	61	48	45	71	67	69	47	73	69	68	80	92	12	.....	Sarnia
Stratford	17	15	13	9	16	14	8	2	9	15	7	10	15	6	1	9	12	6	15	19	46	33	21	42	24	29	5	.....	Stratford.
Sandwich	47	31	25	46	47	35	57	38	11	19	33	16	23	26	16	27	18	51	42	29	19	33	28	35	23	36	.....	.....	Sandwich
St. Thomas	67	20	25	29	23	20	32	12	16	19	22	1	12	6	17	23	9	6	5	8	2	4	3	12	15	19	4	.....	St. Thomas
Sault Ste. Marie	.....	1	74	103	30	12	10	12	8	5	2	12	9	5	7	7	21	16	79	15	36	19	52	47	23	52	9	.....	Sault Ste. Marie
Sudbury	.....	2	5	27	45	54	77	5	119	88	48	45	41	34	54	197	222	172	49	164	117	253	281	223	268	258	40	.....	Sudbury.
Toronto	1 [illegible]	1 705	2 110	2 046	2 090	2 085	1 783	1 444	1 207	960	916	790	563	552	796	1 331	1 022	1 107	1 256	1 575	1 532	1 923	2 016	2 003	2 206	2 386	190	.....	Toronto.
Walkerton	.....	2	8	22	5	6	7	1	13	5	21	6	3	1	4	4	.....	1	1	1	.....	5	8	4	4	6	2	.....	Walkerton
Woodstock	21	28	20	64	55	63	34	24	38	31	29	37	35	32	31	21	33	36	41	31	23	17	24	34	31	32	1	.....	Woodstock
Welland	.....	40	32	12	21	16	7	13	12	11	13	17	16	14	13	20	24	23	24	67	34	24	23	28	21	26	5	.....	Welland.
Whitby	4	.....	.....	.....	5	2	.....	1	2	1	2	.....	1	4	5	2	3	5	2	13	10	29	15	8	18	14	.....	4	Whitby
Lock-ups																													Lock-ups
Atikokan	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Atikokan
Bark's Falls	.....	.....	.....	.....	1	1	.....	.....	.....	.....	2	1	.....	1	.....	.....	4	1	1	4	4	1	6	2	.....	7	7	.....	Bark's Falls
Byng Inlet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	Byng Inlet
Cobalt	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29	29	.....	Cobalt
Killarney	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	.....	30	16	4	.....	12	Killarney.
Manitowaning	.....	13	4	11	18	13	33	22	16	5	16	4	.....	.....	.....	.....	10	18	8	6	21	.....	8	5	8	1	.....	7	Manitowaning
Mine Centre	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	.....	23	12	6	.....	.....	7	Mine Centre.
Webbwood	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	6	2	9	17	18	17	14	16	18	68	8	.....	.....	.....	.....	Webbwood.
Totals	3 [illegible]	3 [illegible]	4,041	4,374	4 719	4,475	3 826	2,841	2 675	2,174	2,236	1 [illegible]	1,596	1 472	1,569	2,282	2,446	2,622	2,819	3 452	3,741	4,1	4 745	4,730	4 987	5 231	500	356	Totals.

SCHEDULE K.

Showing fines imposed and collected in Municipalities under Local Option during the license years 1908-9 and 1909-10.

Municipality.	License District.	Fines imposed. 1908–9	Fines collected. 1908–9	Fines imposed. 1909–10	Fines collected. 1909–10
Kennebec	Addington	.....	.....	$100	$100
Athens	Brockville	.....	.....	100	100
Huron	Bruce, Centre	$170	$170	.....	.....
Amabel	Bruce, North	.....	.....	20	20
Arran	" "	50	50	.....	.....
Hepworth	" "	90	90	.....	.....
Saugeen	" "	50	50	10	10
Southampton	" "	100	100	93	93
Tara	" "	40	40	100	.....
Huntley	Carlton	75	75	.....	.....
Manvers	Durham, East	60	60	.....	.....
Millbrook	" "	75	75	.....	.....
Bowmanville	" West	.....	.....	150	150
Southwold	Elgin, West	100	100	.....	.....
Portland	Frontenac	90	90	.....	.....
Pittsburgh	"	.....	.....	150	150
Cardinal	Grenville	50	50	.....	.....
Artemesia	Grey, Centre	70	70	265	265
Thornbury	" "	50	50	.....	.....
Owen Sound	Grey, North	1,585	1,485	3,280	3,030
Durham	Grey, South	70	70	100	100
Egremont	" "	40	40	100	100
Proton	" "	.....	.....	440	440
Thurlow	Hastings, East	.....	.....	190	190
Tweed	" "	.....	.....	310	310
Rawdon	" North	160	160	.....	.....
Sidney	" West	.....	.....	140	140
Stanley	Huron, South	120	120	.....	.....
Camden	Kent, East	60	60	.....	.....
Raleigh	Kent, West	.....	.....	150	150
Euphemia	Lambton, East	.....	.....	20	20
Wyoming	" "	.....	.....	40	40
Moore	Lambton, West	365	365	130	130
Dalhousie	Lanark, North	50	50	.....	.....
Grimsby	Lincoln	100	100	.....	.....
South Grimsby	"	85	85	.....	.....
Niagara	"	175	175	200	200
Caistor	Monck	20	20	60	60
McLean and Ridout	Muskoka	70	70	.....	.....
Port Carling	"	.....	.....	160	160
Waterford	Norfolk, North	100	100	160	160
North Walsingham	Norfolk, South	50	50	.....	.....
Brighton	Northumberland, East	100	100	120	120
Campbellford	" "	.....	.....	225	225
Colborne	" "	310	310	160	160
Hamilton	Northumberland, West	110	110	.....	.....
Scott	Ontario, North	20	20	.....	.....
Pickering	Ontario, South	20	20	.....	.....
Reach	" "	.....	.....	80	80
Norwich	Oxford, South	315	265	.....	.....
Chinguacousy	Peel	20	20	75	75
Norwood	Peterboro', East	50	50	100	100
Lakefield	" "	60	60	25	25
Smith	" West	50	50	.....	.....

SCHEDULE K.—*Concluded*

Showing fines imposed and collected in Municipalities under Local Option during the license years 1908-9 and 1909-10.

Municipality.	License District.	Fines imposed. 1908-9	Fines collected. 1908-9	Fines imposed 1909-10	Fines collected. 1909-10
Medonte	Simcoe, East	$235	$235	.....	.....
Midland	" "	665	665	$110	$110
Oro	" "	20	20	.....	.....
Creemore	Simcoe, West	90	90	180	180
Nottawasaga	" "	30	30	.....	.....
Osnabruck	Stormont	.....	.....	139	130
Fenelon	Victoria, East	50	50	.....	.....
Somerville	" "	100	100	.....	.....
Eldon	Victoria, West	75	75	20	20
Mariposa	" "	20	20	.....	.....
Woodville	" "	70	70	.....	.....
North Dumfries	Waterloo, South	.....	.....	100	100
Erin	Wellington, East	150	150	20	20
Beverly	Wentworth, North	.....	.....	50	50
Ancaster	" South	90	90	250	250
North Toronto	York, East	.....	.....	100	100
Richmond Hill	" "	.....	.....	50	50
Stouffville	" "	150	150	100	100
Whitchurch	" North	50	50	100	100
Weston	" West	130	20	.....	.....
West Toronto	" "	160	100	.....	.....
Vaughan	" "	.....	.....	100	100
Totals		$7,260	$6,940	$8,563	$8,313

SCHEDULE L.

License District.	Inspector.	P. O. Address.
Addington	James Williams	Arden.
Algoma	James Grigg	Bruce Mines.
Brant, North	A. Kirkpatrick	Paris.
Brant, South	Richd. Eacrett	Brantford.
Brockville	George Ross	Brockville.
Bruce, Centre	Thomas Bradley	Bervie.
Bruce, North	J. W. Reany	Burgoyne.
Bruce, South	Benj. Cannon	Walkerton.
Carleton	Thomas Kerr	Kars.
Dufferin	S. McDowell	Dundalk.
Dundas	Edward P. Foster	Dundela.
Durham, East	John Kennedy	Pontypool.
Durham, West	J. S. McConnachie	Bowmanville.
Elgin, East	W. R. Andrews	Bayham.
Elgin, West	Edward W. Compton	St. Thomas.
Essex, North	Paul Morand	Tecumseth.
Essex, South	J. E. Stone	Essex.
Fort William	James Davidson	Fort William.
Frontenac	John Moreland	Sydenham.
Glengarry	Angus Macdonald	Alexandria.
Grenville	And. Carson	Burritt's Rapids.
Grey, Centre	S. J. Halbert	Markdale.
Grey, North	M. C. Beckett	Owen Sound.
Grey, South	Thomas Davis	Durham.
Haldimand	J. B. Wilson	Hagersville.
Haliburton	J. R. Erskine	Haliburton.
Halton	W. A. Ferrah	Oakville.
Hamilton	J. Sturdy	Hamilton.
Hastings, East	John Stokes	Tweed.
"	Robert M. Jack, Prov. Officer	Deseronto.
Hastings, North	Thomas H. Moore	Queensboro'.
Hastings, West	Hugh Walker	Belleville.
"	P. J. Peterson, Prov. Officer	Trenton.
"	Jacob Hubble " "	Frankford.
Huron, North	William Clegg	Wingham.
Huron, South	John Torrance, Sr.	Clinton.
Huron, Centre	Alfred Asquith	Auburn.
Kenora	Jno. Branchley	Kenora.
Kent, East	B. W. Wilson	Ridgetown.
Kent, West	Thos. M. French	Chatham.
Kingston	Clark W. Wright	Kingston.
Lambton, East	P. D. McCallum	Forest.
Lambton, West	George Lucas	Sarnia.
Lanark, North	J. J. McGregor	Carleton Place.
Lanark, South	W. Hyndman	Smith's Falls.
Leeds	F. B. Taber	Morton.
Lennox	Walter Exley	Napanee.
Lincoln	John W. King	St. Catharines.
London	A. R. Galpin	London.

SCHEDULE L.—*Concluded.*

License District.	Inspector.	P. O. Address.
Manitoulin	Wm. Vincer	Mindemoya.
Middlesex, East	Thomas Duffin	Thorndale.
Middlesex, North	Thomas Magladery	Parkhill.
Middlesex, West	John B. Gough	Napier.
Monck	R. N. Killins	Dunnville.
Muskoka	Henry Boyer	Bracebridge.
Nipissing	Jos. N. Lewis	Mattawa.
	J. W. Richardson, Prov. Officer	North Bay.
Norfolk, North	A. W. Birdsell	Waterford.
Norfolk, South	And. Innes	Port Dover.
Northumberland, East	George Gooderich	Dundonald.
" "	A. Chapman, Prov. Officer	Hastings.
Northumberland, West	John McCaughey	Cobourg.
Ontario, North	Charles Kelly	Uxbridge.
Ontario, South	Louis Luke	Oshawa.
Ottawa	John C. Enright	Ottawa.
	Alfred Coleman	
Oxford, North	Walter Shaver	Woodstock.
Oxford, South	Wm. M. Bell	Springford.
Parry Sound, East	W. J. White	Novar.
Parry Sound, West	T. W. Quinn	Parry Sound.
Peel	John D. Orr	Meadowvale.
Perth, North	Robert T. Kemp	Listowel.
" "	Geo. T. Jones, Prov. Officer	Stratford.
Perth, South	Alex. B. Creighton	St. Mary's.
Peterborough, East	Elias Williams	Havelock.
Peterborough, West	Joseph Stewart	Peterborough.
Port Arthur	Alex. R. Elliott	Port Arthur.
Prescott	Joseph Lemieux	L'Original.
Prince Edward	W. G. Sexsmith	Picton.
Rainy River	George Campbell	Fort Frances.
Renfrew, North	Samuel Bromley	Pembroke.
Renfrew, South	John Connolly	Renfrew.
Russell	W. J. Campbell	Metcalfe.
Sault Ste. Marie	Wm. R. Cunningham	Sault Ste. Marie.
St. Catharines	John W. King	St. Catharines.
Simcoe, Centre	Thomas Duff	Barrie.
Simcoe, East	Wellington Fisher	Orillia.
Simcoe, South	R. W. Sloan	Churchill.
Simcoe, West	Robert Henderson	Alliston.
" "	Geo. W. Montgomery, Prov. Officer	Collingwood.
Stormont	A. E. Fetterley	Aultsville.
"	J. M. McDonald, Prov. Officer	Cornwall.
Sturgeon Falls	J. J. French	Sturgeon Falls.
Sudbury	Leo Croteau	Sudbury.
Temiskaming	Wm. S. Blackwall	Haileybury.
Toronto	Joseph Johnston	Toronto.
	Robert Burroughs	
	P. J. Jennings	
Victoria, East	James Lithgow	Bobcaygeon.
Victoria, West	William Thornbury	Lindsay.
Waterloo, North	Ferdinand Walter	Berlin.
Waterloo, South	R. H. Knowles	Hespeler.

SCHEDULE L. —*Concluded.*

License District.	Inspector.	P. O. Address.
Welland	Geo. House	Stevensville.
Wellington, East	Josiah Hampton	Mount Forest.
Wellington, South	J. W. Oakes	Guelph.
Wellington, West	John Gordon	Drayton.
Wentworth, North	John Nicholson	Waterdown.
Wentworth, South	R. T. Gould	Bartonville.
Windsor	Gaspard Pacaud	Windsor.
York, East	Wm. M. Thompson	Danforth.
York, North	James Wayling	Newmarket.
York, West	D. MacKenzie	Woodbridge.

STATEMENT OF LICENSE REVENUE FOR FINANCIAL YEARS.

Statement showing Revenue from Liquor Licenses received by the Province of Ontario for the financial years ending 31st December, 1908, the ten months ending October 31st, 1909, and the financial year ending October 31st, 1910.
Revenue for:

1908	Brewers' Warehouse Licenses	$6,300 00	
	Brewers' Licenses	30,562 50	
	Distillers' Licenses	44,666 67	
	Wholesale Licenses	9,487 75	
	Tavern and Shop Licenses, Transfers and Fines	485,098 44	
	Refund for Collection of Revenue and Premium on Fidelity Bonds	1,655 75	
			$577,771 11
1909 (Ten months)	Brewers' Warehouse Licenses	$7,000 00	
	Brewers' Licenses	31,400 00	
	Distillers' Licenses	44,666 67	
	Wholesale Licenses	8,600 00	
	Sample and Commission Licenses	3,900 00	
	Seized Liquor	1,133 83	
	Tavern and Shop Licenses, Transfers and Fines	254,895 29	
	Refund for Collection of Revenue and Premium on Fidelity Bonds	2,186 75	
	Fines from L. O. Thamesville	146 52	
			$353,929.06
1910	Brewers' Warehouse Licenses	$7,216 68	
	Brewers' Licenses	31,650 00	
	Distillers' Licenses	44,666 67	
	Wholesale Licenses	13,612 50	
	Sample and Commission Licenses	2,575 40	
	Seized Liquor	2,572 57	
	Tavern and Shop Licenses, Transfers and Fines	475,995 61	
	Refund for collection of Revenue and Premium on Fidelity Bonds	1,873 00	
			$580,162 43

THIRTY-SIXTH ANNUAL REPORT

OF THE

Ontario Agricultural College

AND

Experimental Farm

1910

PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1911.

Printed by
WILLIAM BRIGGS,
29-37 Richmond Street West,
TORONTO

To the Honourable JOHN MORISON GIBSON, K.C., LL.D., etc., etc., etc.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

The undersigned begs to present for the consideration of Your Honour the Report of the Ontario Agricultural College and Experimental Farm for 1910.

Respectfully submitted,

JAMES S. DUFF,

Minister of Agriculture.

TORONTO, 1911.

THE ONTARIO AGRICULTURAL COLLEGE, GUELPH.

HON. JAMES S. DUFF, *Minister of Agriculture, Toronto.*

FACULTY OF INSTRUCTION, 1910-1911.

(All except the President arranged in order of Seniority.)

G. C. CREELMAN, B.S.A., LL.D. ..... President.
H. H. DEAN, B.S.A. ..... Professor of Dairy Husbandry.
C. A. ZAVITZ, B.S.A. ..... Professor of Field Husbandry.
J. HUGO REED, V.S. ..... Professor of Veterinary Science.
H. L. HUTT, B.S.A. ..... Professor of Landscape Gardening.
G. E. DAY, B.S.A. ..... Professor of Animal Husbandry.
J. B. REYNOLDS, B.A. ..... Professor of English.
R. HARCOURT, B.S.A. ..... Professor of Chemistry.
MISS MARY URIE WATSON ..... Director of Home Economics.
JOHN EVANS ..... Professor of Manual Training.
S. B. MCCREADY, B.A. ..... Professor of Botany and Nature Study.
S. F. EDWARDS, M.S. ..... Professor of Bacteriology.
C. J. S. BETHUNE, M. A., D.C.L. ..... Professor of Entomology and Zoology.
W. R. GRAHAM, B.S.A. ..... Professor of Poultry Husbandry.
W. H. DAY, B.A. ..... Professor of Physics.
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J. E. HOWITT, M.S.Agr. ..... Lecturer in Botany.
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MORLEY PETTIT ..... Lecturer in Apiculture.
MISS GRACE GREENWOOD ..... Instructor in Normal Methods.
E. W. KENDALL ..... Lecturer in Manual Training.
L. CAESAR, B.A., B.S.A. ..... Lecturer in Fungus Diseases and Insects.
W. J. SQUIRRELL, B.S.A. ..... Lecturer in Field Husbandry.
H. L. FULMER, B.S.A. ..... Lecturer in Chemistry.
R. W. STRATTON ..... Demonstrator on Cream Separators and in Butter Making.
G. R. TAYLOR ..... Demonstrator in Milk Testing.
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MISS M. A. PURDY ..... Demonstrator in Chemistry.
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MISS JEAN RODDICK ..... Instructor in Domestic Science.
MISS ALTA DICKEY ..... Instructor in Domestic Art.
MRS. F. DOUGHTY ..... Demonstrator in Domestic Art.
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MISS MARY MCLENNAN ..... Demonstrator in Domestic Science.
A. H. MCLENNAN, B.S.A. ..... Demonstrator in Pomology.
ALEX. MCKAY ..... Demonstrator in Cheese Making.
L. D. JACKSON, B.A. ..... Demonstrator in Chemistry.
G. E. SMITH ..... Demonstrator in Chemistry.
G. P. MCKAY, B.A. ..... Fellow in Chemistry.
H. S. RINGLAND, JR. ..... Instructor in Athletics.

COLLEGE OFFICERS.

S. SPRINGER ..... Bursar
J. B. FAIRBAIRN ..... Secretary and Registrar.
W. O. STEWART, M.D. ..... Physician.
MRS. K. FULLER ..... Superintendent Macdonald Hall.
MRS. CUNNINGHAM ..... Matron Agricultural College.

ONTARIO AGRICULTURAL COLLEGE AND EXPERIMENTAL FARM.

1910.

To the Honourable the Minister of Agriculture:

SIR,—I have the honour to submit herewith the thirty-sixth annual report of the Ontario Agricultural College and Experimental Farm, including the report of the Macdonald Institute, for the year 1910.

The following is a brief review of the work contained in this report:—

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Respectfully submitted,

G. C. CREELMAN,

President.

Ontario Agricultural College.

PART I,

THE PRESIDENT.

Again it is our privilege to submit to the Minister of Agriculture an annual report of the work done at the College during the year. If the success of an institution of this kind is to be measured by the number of students in attendance, then the year 1910 has been a successful year at this institution. We record a total attendance of 1,386, there being ninety more students in all classes than in the previous year, and each class has been well filled. One hundred and fifty-one freshmen in the long course in agriculture were admitted this fall, which is very much larger than that of any previous year. This means that our classroom and laboratory accommodation and the capacity of our teaching staff have been very heavily taxed; hence the necessity for increased accommodation comes up again with greater force than ever. Each of our instructors, however, has made the best of the situation, and the students have all received good instruction in the several branches of our work.

We are pleased to note the continued appreciation of our work by the farmers in the Province, as is shown by the large number of students coming to us from Ontario farm homes, and also by the great crowds of farmers who come to us each year during the month of June. We are also getting the usual number of students from foreign countries, and more particularly from Great Britain and her colonies.

Agricultural Education.

This College has probably been unique among educational institutions in Ontario, in that it attempts not only to teach the sciences underlying the practice of agriculture to all students in attendance, but goes farther, and tries to reach, as far as possible, the older brothers and sisters and the fathers and mothers on their own farms. For a number of years this latter phase of the work has been accomplished by the writing of bulletins and reports, and by addressing public meetings throughout the country. While both of these methods have brought good results, yet they have not reached the indifferent farmer, nor have they in every instance materially assisted the ordinary farmer in solving the daily problems that arise on the farm.

We have felt for a long time that we must reach the younger people, if the best results are to be accomplished. Farmers' clubs have been established in recent years, and farmers themselves are now holding meetings at many points at regular intervals, and I believe are accomplishing a great deal of good. But what about the smaller boys and girls in the public schools, when their time is not worth very much, and when their minds are alert and quick to take up new ideas along all lines of activity?

By co-operation with the Education Department we have been enabled in recent years to secure the attendance at this College of a large number of public

school teachers. By enthusiastic effort on the part of our staff, and simple, practical lessons and demonstrations, these teachers have carried away at least an appreciation of the work which we are doing for farmers and what we desire to do for the children in rural places. While there are many ways in which a teacher may help the country scholar, yet it would seem that the most practical means yet adopted is through the school garden. This can be carried out on a smaller or larger scale anywhere. It opens up a new field of thought each week as growth progresses; it suggests problems in plant life and the production of foodstuffs; it gives variety of work during school hours; and it suggests farm problems which have already been solved and the solutions published by the College authorities. The reports and bulletins containing such information can then be intelligently discussed with the pupil and the parents, and in this way the work of the school can be brought in closer touch with the work of the farm.

Two Teachers' Courses are now held each year: One of ten weeks, during April, May, and June, the teachers for this course being sent to us by the Education Department from the Normal Schools; and the other, a summer course of four weeks, for those who are actually engaged in teaching. We believe if this process is continued, much good will be accomplished for the rural districts.

Agricultural Specialists.

Three more men were added to this list in June last, making fourteen graduates now engaged in this work, together with twelve assistants, all of whom are Agricultural College men:

R. S. Duncan, for Durham and Northumberland Counties, located at Port Hope.

A. D. McIntosh, for Hastings County, located at Stirling.

S. E. Todd, for Lambton County, located at Petrolea.

In addition to these, we now have the following named gentlemen acting in the capacity of Representatives of the Department of Agriculture and Teachers of Agriculture in the high schools:

Name	County	Location
Angle, P. E.	Norfolk	Simcoe
Campbell, A. D.	Dundas	Morrisburg
Duff, H. C.	Peterborough	Norwood
Hamer, R. S.	Lanark	Perth
Hare, J. H.	Ontario	Whitby
Hart, F. C.	Waterloo	Galt
Jackson, W. D.	Carleton	Carp
McKenney, A.	Essex	Essex
McKenzie, D. A.	Victoria	Lindsay
McVannel, A. P.	Prince Edward	Picton
Metcalf, I. F.	Simcoe	Collingwood

I believe all of these men are doing good work, and judging from the reports received from their schools, from townspeople, and from farmers in each vicinity, I am firmly of the opinion that this is the greatest move in modern times in the direction of carrying agricultural information direct to the farmer on his own farm.

Changes in Staff.

As usual, I am obliged to report a number of changes in staff, owing, as a general thing, to better positions being offered by other institutions.

In the Chemical Department, Mr. W. P. Gamble, B.S.A., one of our oldest and most faithful instructors, resigned his position as Professor of Soil Chemistry, and left at the beginning of April. On the 1st of June Mr. A. E. Slater, B.S.A., Demonstrator in the same Department, also resigned. On the recommendation of the Professor of Chemistry, Mr. H. L. Fulmer, B.S.A., and Mr. L. D. Jackson, B.A., were raised to the positions of Lecturer and Demonstrator respectively, and Mr. G. E. Smith, of Toronto University, and Mr. G. McKay, B.A., of McMaster University, were engaged to fill the vacancies.

In the Experimental Department we were very sorry, indeed, to lose the services of Mr. John Buchanan, B.S.A., who for many years has been the chief assistant in our experimental work. Mr. Buchanan left to accept a more lucrative position as Park Commissioner for the City of Calgary, Alta.

Mr. W. J. Squirrel, B.S.A., Mr. C. R. Klinck, B.S.A., and Mr. A. W. Mason, B.S.A., each received promotion in the Department.

In the Pomological Department Mr. A. MacMeans resigned to take a better position in North Dakota, U.S.A., and Mr. A. H. MacLennan, B.S.A., was transferred from the Poultry Department to take his place.

Macdonald Institute.

At Macdonald Institute the sad and sudden death of Mrs. John Hoodless, of Hamilton, created a vacancy that we find very hard to fill. Mrs. Hoodless had been prominent in Household Science circles long before Macdonald Institute was established. She and Dr. James Mills and Prof. James W. Robertson and Sir William Macdonald were the four persons who had most to do with this institution in its beginning. Sir William Macdonald supplied the money; Prof. Robertson and Dr. Mills prepared the plans and saw to the expenditure of the money; while Mrs. Hoodless gave her services and advice freely at all times to the many, many details that had to be discussed in the establishing of an institution particularly adapted to the practical education of women.

Again, in September we were notified by one of our older teachers, Miss Greist, who had charge of the Domestic Art Work, that she would not be able to return at the time school opened, as she had been through a severe operation and was not rapidly recovering. As a matter of fact, there was no hope from the beginning, and Miss Greist died at her home in Indiana early in November, much mourned by all of her friends here and the hundreds of students and ex-students who had taken instruction from her. Miss Alta Dickey, of Teachers' College, New York, has been appointed temporarily in charge of the work in Domestic Art.

In the absence of Dr. Annie Ross, who has a year's leave of absence to study in New York, Prof. A. L. McCrimmon, of McMaster University, comes up once a week and lectures to the Normal Classes on the History of Education and Psychology. Mrs. Frank Hart, a graduate of Macdonald Institute, has charge of the work in the meantime in Home Nursing, Physiology and Hygiene, while Miss Josephine Magwood, of Toronto, has charge of Athletics.

I have also to record the resignation from our staff of Captain William Clark, a man who for years gave his services without any recompense to the physical training of the students at this College, and as drill instructor almost since its

inception. We regret that the time has come when Captain Clark feels the work too strenuous for one of his age, and we take pleasure in recording at this time our appreciation of his long and faithful service.

Home Economics.

As facilities become available, parents seem to approve of more practical education for their daughters. Not so long ago it was thought that painting and music, a study of literature, and the writing of essays, constituted the essentials of a young woman's education. Much money and much time were spent in the endeavour to teach girls so-called cultural studies, for which very many of them had neither taste, talent, nor inclination. Nowadays, with the high cost of living, the scarcity of good servants, and the artificial conditions of city life, parents are beginning to realize that their daughters should be first given an opportunity of learning those sciences which underlie the practice of right living. Cooking and sewing and the washing of clothes, or the superintending of these things, constitute a very large part of every woman's life. Servants are kept in a very small proportion of our homes, with the result that our own women folk, as a rule, do all the housework. What an advantage it is, then, for at least one woman in the home to have had a systematic training in the ordinary details of home work. It is a great pleasure to see these hundreds of girls at work every year at Macdonald Institute, and I firmly believe that they will have an influence in the feeding of and caring for the people of this nation.

College Work and Progress.

With the increased number in attendance this year crowding is more apparent in every direction. Every bed in the College Residence has been occupied, and more than a hundred men have been obliged to find boarding places in the hotels and private houses in Guelph and the vicinity. I regret this very much, as there is no doubt that a boy gets much more out of his College course by living with the other boys, and I trust that this year we shall get our new building, including dining-hall, kitchen, cold storage facilities, and servants' quarters, so that the space in the men's residence at the present time devoted to cooking and serving may be given over to students' rooms, and so give an opportunity for inside accommodation to the majority of the men now living out.

The drainage survey work in connection with the Department of Physics has increased very rapidly during the past two or three years. During this past summer no less than eight men have been constantly engaged in this work, and yet they have not nearly kept up with the number of applicants asking for help.

The bulletins prepared during the year by members of the College Staff and published by the Department of Agriculture are as follows:

180. "Flour and Breadmaking," by R. Harcourt and M. Purdy.
185. "Little Peach," by L. Caesar.

Short Courses.

These courses continue very popular, larger numbers attending each year. We also find men returning from year to year to take one or more of these courses, and each year they come back with pertinent questions to be asked and practical problems to be solved. The attendance at these courses for 1910 was as follows:—

Dairy Courses, 42; Teachers' Course (Agriculture, Horticulture, and Industrial Arts), 87; Short Course in Stock and Seed Judging, 248; Short Course in Poultry Raising, 24; Short Course in Horticulture, 107; One-Month Course in Domestic Science, 18; One-Month Course in Elementary Agriculture and Nature Study, 57, and One-Month Course in Manual Training, 43.

STUDENTS OF THE YEAR.

Attendance.

General Course	443
Specialists in General Course Work	21
Manual Training (One-Year Normal Course)	13
Teachers' Courses (Agriculture and Horticulture, 40; Industrial Arts, 37)	77
Dairy Courses	42
Stock and Seed Judging	248
Poultry Raising	24
Fruit Growing	107
	975

At Macdonald Institute.

Domestic Science	308
Nature Study and Elementary Agriculture (57); Industrial Arts (43) (Summer School)	100
	408
Total	1,383

There were also 97 children from the Guelph Public Schools who received Instruction in Domestic Science at Macdonald Institute.

Analysis of College Roll (General Course), 1910.

From Ontario.

Algoma	3	Hastings	4	Peel	6
Brant	10	Huron	4	Perth	10
Bruce	4	Kent	6	Prince Edward	1
Carleton	10	Lambton	13	Renfrew	2
Dufferin	3	Lanark	3	Russell	5
Dundas	5	Leeds	3	Simcoe	10
Durham	2	Lincoln	12	Thunder Bay	2
Elgin	8	Middlesex	13	Victoria	3
Essex	6	Muskoka	1	Waterloo	13
Frontenac	1	Nipissing	1	Welland	7
Glengarry	2	Norfolk	3	Wellington	31
Grenville	3	Northumberland	5	Wentworth	17
Grey	9	Ontario	10	York	24
Haldimand	3	Oxford	10		
Halton	13	Parry Sound	2	Total for Ontario...	303

From Other Provinces of the Dominion.

Alberta	9	New Brunswick	2	Saskatchewan	8
British Columbia	27	Nova Scotia	11		
Manitoba	4	Quebec	2	Total for other Provinces	63

From Other Countries.

Argentine Republic...	2	Ireland	3	Spain	1
Brazil	1	India	1	U. S. A.	10
Denmark	1	Japan	2	Wales	2
East Indies	1	Jamaica	5		
England	26	New Zealand	2	Total for other Countries	77
France	1	Scotland	6		
Germany	1	South Africa	12		

Ages and Religious Denominations.

The limits of age of students in the General Course, 1910, ranged from 16 to 40 years. The average age was 21.

Baptists	29	Evang. Assoc.	2	No Religion	7
Christian Assoc.	1	Friends	4	Presbyterian	130
Christadelphian	3	Jewish	1	Roman Catholic	14
Congregational	4	Latter-day Saints	1	Unitarian	1
Disciple	3	Lutheran	1	United Brethren	4
Dutch Reform	2	Mennonite	2	Swedenborgian	1
Episcopalian	110	Methodist	123		

Bachelors of the Science of Agriculture, 1910.

Bengough, W. L., Toronto, Ont.
Bowman, W., Georgetown, Ont.
Carpenter, J. F., Fruitland, Ont.
Clancey, R. H., Guelph, Ont.
Collins, G. W., Guelph, Ont.
Cooley, R. B., Canifton, Ont.
Edwards, W. E. J., Balsam, Ont.
Ellis, F. E., Norwich, Ont.
Fraser, R., Galetta, Ont.
Harries, J. F., Cardiff, S. Wales.
Kennedy, S., Apple Hill, Ont.
Learmonth, C. M., Galetta, Ont.
Lloyd-Jones, J. G., Llandinan, Mont., Wales.
MacRae, D. E., Cumberland, Ont.
Moorhouse, R. L., Cairo, Ont.
Neville, S. J., Cottonwood, Sask.
Nunnick, F. C., Scotland, Ont.
Reek, W. R., Romney, Ont.
Robinson, E., Guelph, Ont.
Shaw, A. M., Niagara Falls South, Ont.
Smith, A. S., Chesterville, Ont.
Snyder, A., Blair, Ont.
Todd, S. E., Guelph, Ont.
Tothill, J. D., Bungay, England.
White, O. C., Ashburn, Ont.

Recipients of Associate Diploma, 1910.

Auld, J. H., Guelph, Ont.
Barnett, C. A., Rannoch, Ont.
Bergy, S. A., Mannheim, Ont.
Bland, A. G., Kelowna, B.C.
Bosman, A. M., Pretoria, Transvaal.
Boyd, F. A. W., Toronto, Ont.
Brown, R. W., Attercliffe, Ont.
Cherry, P. A. B., The Heath, Upton-on-Severn, Eng.
Clark, S. H., Cainsville, Ont.
Clemens, R. H., Galt, Ont.
Culver, L. D., Waterford, Ont.
Curtis, J. C., Virden, Man.
Davison, W., Willow Point, B.C.
Dawson, W., Vars, Ont.
Dent, T. R., Woodstock, Ont.
Diaz, R., Ferrol, Spain.
Dunkin, G. S., Norwich, Ont.
Evens, W. A., Randolph, Ont.
Falconer, J. M., Hatuma, New Zealand.
Fay, J. F., West Cheshire, Conn.
Fraser, W. J., Revelstoke, B.C.
Graham, W. L., Britannia Bay, Ont.
Green, R., Oak Leaf, Ont.
Grimmer, N. N., Pender Island, B.C.
Harries, J. F., Cardiff, S. Wales.
Hefler, F. L., Exeter, Ont.
Johnston, J. T., Navan, Ont.
Kelly, W. A., Aldboro, Ont.
Knapp, J. S., Merrickville, Ont.
Lord, S. A., Jamaica, B.W.I.
McCullough, C., Epsom, Ont.
McEwen, L., Wroxeter, Ont.
McIlquham, J. M., Lanark, Ont.
McLennan, C. M., Buffalo, N.Y.
McMillan, A., Dutton, Ont.
McRae, F. C., Beaverton, Ont.
McRostie, G. P., Metcalfe, Ont.
McTaggart, A., Wellington, New Zealand.
Murray, R. H., Avening, Ont.
Neff, E. F., Hamilton, Ont.
Palmer, E. B., Carlyon, Ont.
Palmer, C. L. S., London, England.
Pate, A. W., Brantford, Ont.
Petch, C. E., Toronto, Ont.
Phillips, H. L., Johannesburg, S.A.
Powell, F. T. S., Skibbereen, Ireland.
Rebsch, C. C., Hallandale, Wis., U.S.A.
Reeves, F. S., Kamloops, B.C.
Reinicke, O. S. H., Middleburg, Transvaal.
Renwick, F. W., Romney, Ont.
Rettie, J. E., Living Springs, Ont.
Robb, O., Sheffield, Ont.
Rogers, S., Johannesburg, Transvaal.
Rogers, C., Johannesburg, Transvaal.
Ryrie, H. S., Oakville, Ont.
Shaver, F., Cainsville, Ont.
Shields, J. M., Smith's Falls, Ont.
Smith, J. E., Shallow Lake, Ont.
Sorley, J. N., Cummings Bridge, Ont.
Spencer, G. J., Yercaud, Shevarey Hills, S. India.
Stevenson, L., Ancaster, Ont.
Stewart, P., Smith's Falls, Ont.
Tipper, R. M., Ashworth, Ont.
Underhill, M. J., Richards Landing, Ont.
Upton, H. E., Peabody, Mass., U.S.A.
VanSickle, P. O., Trinity, Ont.
Webster, C. A., Dundas, Ont.
Weir, E. A., Randwick, Ont.
White, E. W., New Westminster, B.C.
Wright, W. H., Grimsby, Ont.
Wright, C. H., Agassiz, B.C.

First Class Men.

The work of the College is divided into departments, and all candidates who obtain an aggregate of seventy-five per cent. of the marks allotted to the subjects in any department, are ranked as first class men in that department. The following list contains the names of those who gained a first class rank in the different departments, at the examinations held in April, 1910, arranged alphabetically.

First Year.

Bramhill, G. G., in one department, Biology.
Britton, E. J., in three departments, English and Mathematics; Chemistry and Physics; and Biology.
Grange, J. B., in two departments, English and Mathematics; and Chemistry and Physics.
Harding, P. S. D., in one department, Biology.
Henry, L. B., in three departments, English and Mathematics; Chemistry and Physics; Biology.
Hextall, L. J., in three departments, Chemistry and Physics; Biology; Agriculture.
Hopkins, S. H., in four departments, English and Mathematics; Chemistry and Physics; Biology; Agriculture.
Kay, H. R., in two departments, Chemistry and Physics; Biology.
King, H. M., in one department, Agriculture.
Miller, J., in one department, English and Mathematics.
Nixon, H. C., in one department, English and Mathematics.
Reid, H., in one department, English and Mathematics.
Stairs, K., in two departments, English and Mathematics; Biology.
Stanley, C. W., in four departments, English and Mathematics, Chemistry and Physics; Biology; Agriculture.
Stark, J. W., in two departments, Chemistry and Physics; Biology.
Tisdale, W. H. J., in three departments, English and Mathematics; Chemistry and Physics; Biology.
Young, J. M., in two departments, English and Mathematics; Biology.

Second Year.

Aikenhead, W. M., in one department, English.
Knapp, J. S., in one department, Chemistry and Physics.
McIlquham, J. M., in three departments, English; Chemistry and Physics; Agriculture.
McTaggart, A., in one department, English.
Palmer, E. B., in two departments, English; Chemistry and Physics.
Phillips, H. L., in one department, English.
Powell, F. T. S., in one department, English.
Rebsch, C. C., in two departments, Chemistry and Physics; Biology.
VanSickle, P. O., in three departments, English; Chemistry and Physics; Agriculture.
Weir, E. A., in one department, English.

Scholarships.

Scholarships of $20 each in money were awarded for groups of subjects in first year work as follows: Highest standing with a minimum of forty per cent. of the marks for each subject, and an aggregate of seventy-five per cent. of the total number of marks allotted to the subject in the group:

English and Mathematics, J. Miller, Mt. Elgin, Ont.
Chemistry and Physics, C. W. Stanley, Granton, Ont.
Biology, P. S. D. Harding, Lacombe, Alta.
Agriculture, L. J. Hextall, Calgary, Alta.

Professional Dairy School Certificates Issued During 1910.

A. E. Barber, Cumberland, Ont. ..... Cheese.
W. J. Clark, Harriston, Ont. ..... Cheese.
Geo. Neilson, Langenburg, Sask ..... Butter.
I. C. Goodhand, Corbett, Ont. ..... Butter.
A. L. Andress, Indian River, Ont. ..... Cheese.
J. E. Wilson, Keyser, Ont. ..... Cheese and Butter.
Geo. R. Taylor, Dairy Dept., O.A.C. ..... Butter.

MACDONALD INSTITUTE.

Summary of Attendance in 1910.

A.—January to June, completing the College year of 1909-1910.

1. Normal Students:	
(*a*) Juniors of Two-year course	15
(*b*) Seniors of Two-year course	21
(*c*) Seniors of One-year course	4
2. Housekeepers—Two-year course:	
(*a*) Juniors	9
(*b*) Seniors	6
3. Homemakers—One-year course:	19
4. Short Course in Domestic Science—Three months:	
(*a*) Winter term students	49
(*b*) Spring term students	34
5. Short Course in Sewing—Three months:	
(*a*) Spring term students	11
6. Optional Students:	2
7. Student-workers:	6
8. Public School Students:	49

B.—Summer Course in Domestic Science 18

C.—September to December, opening the College year of 1910-1911.

1. Normal Students:	
(*a*) Juniors of Two-year course	15
(*b*) Seniors of Two-year course	14
(*c*) Seniors of One-year course	8
2. Housekeepers—Two-year course:	
(*a*) Juniors	13
(*b*) Seniors	8
3. Homemakers—One-year course:	45
4. Short Course in Domestic Science—Three months:	17
5. Short Course in Sewing—Three months:	12
6. Optional:	4
7. Student-workers:	2
8. Public School Students:	57
Total	438

D.—Students counted in both above lists:

1. In Two-year courses	21
2. In Public School Classes	9
	30

E.—Total number of students in 1909 445

F.—Total number of students in 1910 408

Note.—Decrease is partly owing to the facts that 1909 public school classes had 30 more than 1910, and to the limited accommodation of the residence.

Graduates of 1910.

Homemaker Course:

Frances Muriel Cameron, St. Thomas.
Minnie R. Coo, London.
Ethel M. Fenwick, Brandon, Man.
Hildegarde Freeland, Toronto.
Grace Knowlson, Lindsay.
Jessie McGie, Belleville.
Ella McGinnis, Belleville.
Edna McMurtry, Galt.
Berenice Phin, Moosomin, Sask.
Isabel B. Saunders, Toronto.

The following received Professional Housekeeper certificates after accomplishing six months' institution housekeeping:

Jessie Blyth, Penetanguishene.
Maud Davison, Cannington.
Nealina MacMillan, Macdonald Coll., Que.
Marion K. Rutherford, Owen Sound.

Two-year Normal Course:

Jessie A. Allen, Mount Forest.
Lucie Emma Bailey, Barrie.
Florence B. Belton, London.
Laura A. Black, Shelburne.
Edna Bryans, Toronto.
Gertrude I. Dobson, Fordwich.
Grace M. Edwards, London.
Irene Eedy, St. Mary's.
Jean L. Flavelle, Lindsay.
Marjorie M. Goldie, Guelph.
Winifred J. Hales, Hallock, Minn.
Louise D. Hogg, Perth.
Maysie Hutchison, Penetanguishene.
Amoret L. Kendall, Brockville.
Eva E. McMahen, London.
Bessie Marsales, Wingham.
Lois Peers, Woodstock.
Florence Pringle, Guelph.
Marjorie B. Smyth, Berlin.
Georgina G. Stiven, Guelph.
Mabelle Stuart, London.

One Year Normal Course:

Grace Calhoun, Ottawa.
Charlotte E. Green, Cornwall.
Garnette Freeman, Freeman.
Sue Candace Irwin, Markdale.

Housekeeper Course:

Eva Bonnell, Bobcaygeon.
Sibylla Hadwen, Hamilton.
Mary Murdoch, Palmerston.
Annie A. Pettingell, Sarnia.
Mrs. Agnes C. Simmons, Quebec, P.Q.
Margaret I. Smeilie, Fort William.

The George Chapman Scholarship.

A prize of $20 in books awarded on the work in English of the first two years. The three divisions of the work under the English Department are taken into consideration in awarding the prize, namely, English Literature, English Composition and Public Speaking. Winner in 1910: P. O. VanSickle, Trinity, Ont.

Prizes.

Three prizes of the value of $10 each in books were awarded as follows:

One to the second year student who composed and read before a committee the best essay on the subject assigned for the year, viz., "Social Life in Rural Districts." Winner: R. Macdonald, Avonbank, Ont.

One to the student who stood first in general proficiency on first and second year work—Theory and Practice—P. O. VanSickle, Trinity, Ont.

One to the student who ranked highest in general proficiency and obtained first-class honors in his major subjects in the fourth year. Winner: S. E. Todd, Guelph, Ont.

Special Prizes.

Second year prize in English: F. T. S. Powell, Skibbereen, Ireland.
Third year prize in English: J. Spry, Easton's Corners, Ont.

Medals.

Governor-General's Silver Medal: First in general proficiency, first and second year work, 1909-1910. Winner: P. O. VanSickle, Trinity, Ont.

Barton-Hamer Gold Medal: Awarded to that member of the O. A. C. International Live Stock Judging Team securing the highest number of marks in the Students' Judging Contest, held annually at Chicago. Winner, December, 1909, O. C. White, Ashburn, Ont.

RESULTS OF JUDGING COMPETITION.

WINTER FAIR, 1910.

On Thursday, December 8th, at the Guelph Winter Fair, a judging competition in Live Stock was held for young men twenty-five years of age and under. The competitions were in charge of Professor G. E. Day, Professor J. Hugo Reed, J. E. Brethour, J. Jackson, W. W. Ballantyne, and R. S. Stevenson. Sixty per cent. of the points was given for placing, forty per cent. for reasons. The O. A. C. students who won in the various classes are as follows:

HORSES.	BEEF CATTLE.	DAIRY CATTLE.
1. M. C. Herner.	1. F. Marcellus.	1. E. A. Puleston.
2. B. H. Landels.	2. P. S. D. Harding.	2. H. M. King.
3. C. S. Shibley.	3. C. L. Smith.	3. L. C. Adair.
4. J. G. Taggart.	4. R. Austin.	4. W. Dawson.
5. R. L. Rutherford.	5. E. Bradt.	5. J. S. Dunlop.
6. J. C. Steckley.	6. A. J. Shantz.	6. R. S. Beckett.
7. T. O. Clark.	7. H. Cooke.	7. C. W. Buchanan.
8. W. B. Finnie.	8. O. McConkey.	8. K. Stairs.
9. C. W. Buchanan.	9. G. L. Honey.	9. D. C. Holliday.
10. J. P. Sackville.	10. L. C. Adair.	10. A. Fleming.

SHEEP.	SWINE,
1. J. Steckley.	1. W. H. J. Tisdale.
2. A. Clapp.	2. W. Jeffrey,
3. (Outsider).	3. W. B. Finnie.
4. J. Grange.	4. E. A. Whaley.
5. A. Bosman.	5. G. A. Burns.
6. R. Shortill.	6. J. W. Stark.
7. J. Rettie.	7. G. L. Jarvis.
8. C. Main.	8. J. Kyono.
9. G. Wallace.	9. J. E. Iwanami.
10. J. S. Dunlop.	10. R. L. Vining.

STOCK JUDGING.

During the Fall Term all members of the Fourth Year class who are specializing in Agriculture are given special instruction in the breeding, feeding and handling of live stock. This year the class was composed of some thirty-five men. After visiting stock farms in Ontario, five were selected to represent the class at the International Live Stock Exposition held in Chicago about the first of December, viz., H. A. Dorrance, Seaforth, Ont.; J. E. Smith, Shallow Lake, Ont.; R. G. Thomson, Boharm, Sask.; W. Toole, Whitevale, Ont., and I. B. Whale, Goldstone, Ont. Again the class did well, and although only seventh in general proficiency, yet with three classes each in horses, cattle, sheep and swine, making twelve classes in all, had they done as well on the average in one class of hogs, a breed practically unknown in this country, they would have stood second and one man would probably have led all students from all colleges at the Exposition. Many of the breeds which these young men have to handle in Chicago are entirely different in conformation and type from the breeds commonly bred and exhibited in Ontario, and when you consider further that some of the competing classes had already been through one or more large fairs in preparation for this contest, you will realize that our men are entirely at a disadvantage in the competition. Again, we select men from the Fourth Year only, while most colleges select the five men with the widest experience taken from all classes in the school.

The question may be asked, then: Why do you continue to send a team to Chicago under such discouraging circumstances? The answer is that even though we should stand last each year, our students have before them the opportunity of

seeing the great International Show, with all of its educational facilities. Every man in the class works hard, with the hope that he may be selected as a member of the team. A number of men also go with the team to Chicago to see the requirements of that great market, and in this way the educational value in preparation and at the Show more than compensates for any loss in standing that we may get in competition with the American people on their own grounds. Then, it will not be forgotten that notwithstanding the keen and peculiar kind of competition, our students were successful three years in succession in this world-famed contest.

Excursions.

Again we devoted the month of June to entertaining our friends from country places. Under the auspices of the Farmers' Institutes, large excursions came from all parts of the Province. As far as we can estimate, one-third of those present were here the previous year. The others were either new or had not been to the College for some time. It is very gratifying to see the continued interest farmers are taking in the work of the College and Farm, and from the questions asked and the interest manifested we are led to believe that this institution is occupying a worthy place in the whole economy of rural affairs.

The College also entertained the members of several organizations directly or indirectly interested in our work, and during the year the following associations visited us:

June 4, Canadian Medical Association.
June 30, Society of Charity and Correction.
Nov. 19, Superintendents of Education from the Southern States.

Women's Institutes.

While the Convention of Women's Institutes has outgrown the College and been moved to Toronto, yet we have been instrumental in helping the movement during the year. The Director of Home Economics at this College has for years been collecting printed material which she now finds useful for lending to officers of Women's Institutes. She has now a large correspondence with the different Institutes, and they seem to appreciate her help. In this way we keep closely in touch with the needs of the women on the farm, and, as far as possible, we try to meet these needs—by correspondence, by written publications and by practical instruction to the girls who come to us for longer or shorter courses in domestic science and domestic art.

Experimental Union.

There will be no Union held during the year 1910, as at a meeting of the Executive, held during the time of the Toronto Exhibition, it was decided to hold the Union in January rather than in December. Heretofore it had been held during the same week as the Provincial Winter Fair, but the work had become so crowded that it was thought advisable to hold these two events at different seasons. The Union will, therefore, be held at the time of the Short Course in Stock and Seed Judging, the second week in January. During this time more sessions will be held and the work, we trust, will become a sort of Farmers' Congress and a time when the ex-students of the College expect to return in large numbers for information and consultation regarding farm work and management.

Outside Lecturers.

We have now a well inaugurated system whereby outside lecturers are brought in from time to time to address our students on subjects not embraced by our curriculum. During the year the following persons assisted:

Albright, W. D., London.—"Agricultural Journalism."
Anderson, W., Guelph.—"Educational Work in India."
Cleaver, Dr., Toronto.—"Jean Valjean."
Cowan, H. B., Toronto.—"Agricultural Journalism."
Cutting, A. B., Toronto.—Agricultural Journalism."
Field, Miss Margaret, Toronto.—"Shakespearean Recital."
Hatch, K. L., Wisconsin.—"Agricultural Work in Wisconsin State."
Miller, Miss L. K., Cleveland, Ohio.—"School Garden Work."
Putnam, G. A., Toronto.—"Co-operation of Schools and Institutes."
Scott-Raff, Mrs., Toronto.—"Expression."
Sinclair, Dr., Macdonald College, Que.—"New Adjustments in Modern Education."
Smith, W. L., Toronto.—"Co-operation."
Williamson, E. S., Toronto.—"Dickens."
Wrong, Prof. W. G., Toronto.—"Ethics of Enjoyment."

Financial Statement.

I append the Financial Statement prepared by Mr. S. Springer, Bursar.

I have the honour to be,

Your obedient servant,

Guelph, December 17, 1910. G. C. CREELMAN.

FINANCIAL STATEMENT

(November 1st, 1909, to October 31st, 1910.)

COLLEGE DEPARTMENT.

Expenditure.

Salaries and wages	$67,625 00
Servants' paylist	3,383 30
Meat, bread, groceries, laundry, engine room supplies and fuel	32,915 28
Advertising, printing, postage and stationery	3,863 95
Maintenance, 5 laboratories and gymnasium	7,707 45
Expenses, short courses	1,198 97
Temporary assistance	527 22
Student labor	4,282 14
Travelling expenses and extra lectures	1,799 52
Library	1,911 35
Scholarships	100 00
Telephone service, rent, etc.	395 50
Furnishings and repairs	4,798 96
Sewage	480 00
Contingencies	1,343 21
Total Expenditure	$131,731 85
Less Revenue	36,918 38
Net Expenditure	$94,813 47

Revenue.

Board	$20,513 40
Tuition and laboratory fees	15,008 00
Supplemental examinations	160 00
Chemical analyses	388 47
Rent of cottages	140 00
Rent of rooms	158 00
Rent of post office boxes	39 75
Fines and breakages	476 39
Sundries	34 37
Total Revenue	$36,918 38

Student Labor.

Total per Month.		*To Different Departments.*	
October 12 to 31st	$403 65	College	$356 43
November	573 90	Macdonald Inst.	49 90
December	215 51	Chemical	114 73
January	547 45	Bacteriological	10 44
February	438 90	Entomological	55 55
March	471 93	Physical	84 15
April	55 01	Botanical	22 44
May	428 74	Library	78 30
June	312 35	Farm Dept.	805 17
July	195 64	Experimental	1,116 14
August	110 54	Dairy	25 86
Sept. and October to 12th	528 52	Poultry	458 95
		Horticultural	656 93
	$4,282 14	Mechanical	428 03
		Apiculture	19 12
			$4,282 14

MACDONALD INSTITUTE AND HALL.

Expenditure.

Salaries and wages	$16,931 50
Servants' paylist	1,668 60
Bread, meat, groceries, furnishings, repairs, engine room supplies, fuel and labour on ground	12,954 17
Maintenance of laboratories in Institute	2,884 50
Library and stationery	749 44
Total Expenditure	$35,188 21
Less Revenue	21,092 75
Net Expenditure	$14,095 46

Revenue.

Board	$14,271 35
Tuition and laboratory fees	6,615 00
Supplemental examinations	8 00
Fines, breakages and food purchases by students	132 49
Sale of Supplies to Manual Training Students	65 91
Total Revenue	$21,092 75

FARM DEPARTMENT.

EXPENDITURE.

Permanent improvements	$497 22
Wages of men, foreman and stenographer	6,895 22
Purchase of live stock	3,843 05
Maintenance of stock	3,173 97
Farm maintenance (including repairs, blacksmithing, binder twine, seed, furnishings, fuel, light, advertising, printing, stationery, tools, implements, etc.)	2,678 71
Contingencies	325 39
Total Expenditure	$17,413 56
Less Revenue	6,045 50
Net Expenditure	$11,368 06

NOTE.—Nothing allowed the Farm Department for the feed, etc., of the department horses, and supplies for the College and Macdonald Hall, including milk.

REVENUE.

Sale of cattle:—		
11 cattle, 14,280 lbs. at from 5 to 9 cts.	$989 60	
1 bull for	70 00	
6 cows at from $40 to $75	305 00	
5 bull calves at from $40 to $80	260 00	
		$1,624 60
Sale of pigs:		
110 pigs, 22,674 lbs at from 3 to 10½ cts.	$1,831 40	
12 boar pigs at $10	120 00	
15 sows at from $15 to $30	378 00	
		2,329 40
Sale of sheep:—		
14 sheep, 1,372 lbs. at from $7.50 to $11	$108 92	
3 ewes at from $22 to $28	75 00	
1 ram lamb for	15 00	
		$198 92
Sale of milk:—		
12,550 quarts at 4 cts.	$502 00	
2,965.97 lbs. fat at from 23 to 32.4 cts.	790 49	
2,349 lbs. skim milk at 20 cts. cwt.	4 70	
		$1,297 19
Service of animals		166 50
Sale of 1 colt for		325 00
" 4 bags potatoes at 75 cts.		3 00
" 5 beef hides, 291 lbs at from 8½ to 10 cts.		28 14
" old bellows for		5 00
" 1 lamb skin		75
" 1 old wagon for		5 00
" 46 bus. wheat at $1.25		57 50
" 18 bags at 25 cts.		4 50
Total Revenue		$6,045 50

EXPERIMENTAL DEPARTMENT.

EXPENDITURE.

Permanent improvements	$715 98
Assistant, specialist in plant breeding, stenographer, foreman, teamsters and labourers	9,632 45
Seeds, manure and special fertilizers	581 73
Furnishings, implements, repairs, blacksmithing, etc.	897 80
Printing, postage, stationery and contingencies	322 26
Total Expenditure	$12,150 22

DAIRY DEPARTMENT.

Expenditure.

Permanent improvements		$348 88
Wages, including foreman, cheesemaker, buttermaker, engineer, stenographer and bookkeeper, assistant and official tester of dairy cattle		8,753 00
Purchasing, hauling and manufacturing milk into butter and cheese		5,862 14
Furniture, furnishings, repairs etc., laboratory expenses, gas, chemicals, etc., and contingencies		946 83
Fuel and light		300 00
Total Expenditure		$11,210 85
Less Revenue		8,149 51
Net Expenditure		$3,061 34

Revenue.

Sale of cheese, 12,189 lbs. at from 7 to 25 cts.		$1,455 87
" cream, 1,752 qts. at 20 cts.	$350 40	
" 162 jars Devonshire cream at from 10 to 20 cts.	19 22	
		369 62
" fat, 1,412.88 lbs. at from 23 to 35.4 cts.		413 40
" skimmilk, 94,688 lbs at 20 cts.		189 37
" buttermilk, 113,244 lbs. at from 10 to 40 cts. cwt.	$122 68	
" 23 tickets at 25 cts.	5 75	
		128 43
Dairy testing		205 10
Sundries, milk tests, etc.		7 35
Rent of house		130 00
Manufacturing butter, 123,133.08 lbs. at from 3 to 4½ cts.		5,250 37
Total Revenue		$8,149 51

DAIRY SCHOOL.

Expenditure.

Permanent improvements		$83 32
Wages of instructors, engineer, janitor, stenographer and bookkeeper		2,515 00
Cleaning, painting, repairs and contingencies		279 33
Dairy appliances, separators, vats, expenses and cheese and butter judges, inspecting factories, etc.		499 75
Advertising, printing, stationery, postage, books, papers, etc		145 57
Fuel and light		581 61
Purchase of milk for cheesemaking and cost of hauling milk and cream		2,996 94
Total Expenditure		$7,101 52
Less Revenue		2,735 75
Net Expenditure		$4,365 77

Revenue.

Fees		$67 00
Breakages		4 85
Sale of cheese, 11,683 9-16 lbs. at from 7 to 25 cts.		1,345 24
" cream, 415½ qts. at from 20 to 25c.		84 70
" fat, 186.71 lbs. at from 31 to 32 cts.		59 47
" skimmilk, 61,183 lbs. at 20 cts cwt.		122 36
" buttermilk, 42,100 lbs. at 10cts. cwt.	$42 10	
" 50 tickets at 25c.	12 50	
" 85 qts. at 1 ct.	85	
		55 45
Sundries, 21 milk tests at 5 cts, $1.05; refund express, 30 cts		1 35
Manufacturing butter, 26,700.34 lbs. at from 3 to 4 cts.		995 33
Total Revenue		$2,735 75

POULTRY DEPARTMENT.

Expenditure.

Wages of assistant, stenographer and temporary assistance	$1,050 00
Furnishings and repairs	965 48
Permanent improvements	99 56
Purchase of stock	199 70
Fuel, light and contingencies	300 01
Experiments with incubator, fattening and feed	2,397 19
Total Expenditure	$5,011 94
Less Revenue	3,077 81
Net Expenditure	$1.934 13

Revenue.

Sale of eggs for hatching:—		
312 settings at from 75c. to $2	375 10	
9,271 eggs at from 3c. to 5c.	443 59	
		$818 69
Sale of eggs for domestic use:—		
2,747 dozen at from 10c. to 50c		758 89
Sale of live poultry:—		
488 live birds for		611 55
Sale of dressed poultry:—		
5,397 3-8 lbs. at from 8c. to 45c.	804 13	
71 pairs broilers at from $1 to $1.50	78 75	
2 ducks at 50c.	1 00	
3 goslings at $1.50	4 50	
		888 38
Sale of 10 lbs. feathers at 3c.		30
Total Revenue		$3,077 81

HORTICULTURAL DEPARTMENT.

Expenditure.

Permanent improvements	$295 96
Head gardener and foreman, assistant in plant breeding, assistant and night fireman, teamsters, assistant gardener, stenographer and laborers	6,322 77
Manure, trees, plants, bulbs, seeds, cold storage experiments, implements, tools, furnishings, repairs and contingencies	1,699 68
Fuel and light	816 13
Wax fruit models	396 75
Total Expenditure	$9,531 29
Less Revenue	22 06
Net Expenditure	$9,509 23

Note:—Products supplied to College and Macdonald Hall except when more than required.

Revenue.

Sale of onions:—		
1 bag for	$1 00	
20 bus. for	16 95	
		$17 95
Sale of cabbages, 1-2 dozen for		25
" Squash, 1 1-4 dozen at $1.00		1 25
" Cucumbers, 3 bus. for		2 61
Total Revenue		$22 06

MECHANICAL DEPARTMENT.

EXPENDITURE.

Salary of foreman	$800 00
Tools, furnishings and repairs	241 39
Total Expenditure	$1,041 39

APICULTURE DEPARTMENT.

EXPENDITURE.

Equipment and maintenance	$749 96

SOIL PHYSICS DEPARTMENT.

EXPENDITURE.

Services and expenses of temporary assistants in connection with Farm Drainage Demonstrations	$3,999 27

FORESTRY DEPARTMENT.

Forestry contingencies	$1,434 29

SUMMARY, 1910.

	Expenditure.	Revenue.	Net Expenditure.
College	$131,731 85	$36,918 38	$94,813 47
Macdonald Institute and Hall	35,188 21	21,092 75	14,095 46
Farm	17,413 56	6,045 50	11,368 06
Experimental	12,150 22	.....	12,150 22
Dairy	11,210 85	8,149 51	3,061 34
Dairy School	7,101 52	2,735 75	4,365 77
Poultry	5,011 94	3,077 81	1,934 13
Horticultural	9,531 29	22 06	9,509 23
Mechanical	1,041 39	.....	1,041 39
Apiculture	749 96	.....	749 96
Soil Physics	3,999 27	.....	3,999 27
Forestry	1,434 29	.....	1,434 29
	$236,564 35	$78,041 76	$158,522 59

Yours truly,

S. SPRINGER,

Bursar and Superintendent.

PART II.

THE PROFESSOR OF ENGLISH.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to present herewith my sixteenth annual report for the department of English.

The problem of teaching English at an Agricultural College is a difficult one. At a technical college of any kind it is unusual to devote much, if any, time to a subject not immediately related to the main technical subjects. Yet at this College a four-year course in English is given. There is no doubt in my own mind that the whole of the time allowed to English in these four years could profitably be devoted to the study of Literature alone. English is one of the few purely cultural subjects on our curriculum. On the other hand, it may fairly be claimed that cultural subjects should be studied at schools of general preparation, not at schools where preparation is made for a special pursuit. The justification for the teaching of English Literature at this College is the fact that many of our students have not attended a secondary school of any kind—either high school or university. But while we might for this reason profitably devote to the study of English literature the whole of the time allotted to English, such a course would ignore the training of our students in other important directions. We may not ignore, for the sake of the cultural, the technical possibilities in the English course. At the present time, the technical pursuits open to our students, so far as a course in Agriculture can fit them, are: farming, either general or special; teaching agriculture or one of the allied sciences; experiment station work; agricultural journalism; and the work of district representatives in the counties of Ontario. In any of these pursuits, greater efficiency and usefulness are assured to the man who has cultivated the arts of speaking and writing. The farmer may not be able to farm any better for being able to write a good article, or make a good speech. But he is a more useful citizen for possessing these accomplishments, and an institution like this, supported by the public funds, may properly have regard to a student's future public usefulness as well as to his ability to earn a living for himself. For teaching, a man must have scholarship to command the respect of his students, and above all should be able to express himself correctly and effectively. In experiment station work he is required to report the results of his work, and should know how to prepare articles and bulletins of a quality that will recommend them for popular reading. The district representative should be able to place before his constituents, in the most effective way, through the county press and from the platform, the best agricultural science that he has gained during his college course, and the results of recent research. To our graduates we look for the carrying out of a broad extension policy, by which the best principles and practice of agriculture are brought to the people. It belongs to other departments chiefly to teach the *subject-matter* of the message. I realize that the department of English must accept responsibility for the *manner* in which the message is delivered. In every possible way, therefore, I am trying to develop and perfect our methods of instruction in writing and speaking.

In the matter of public speaking, as in all other arts, it is necessary to strike the correct mean between practice and instruction. It is not enough, in this or any other practical work, to learn to do by doing. The students must be taught what to do, and how to do it. A balance must be maintained between practice and theory. And here is the difficulty. It is comparatively easy to arrange for a certain amount of practice in platform work for each student. But along with that, to know how much instruction, and what kind of instruction, it is best to give, and, if these should be settled, then how to provide the instruction, is not easy to determine. There is a felt need, among some of the students, for instruction in declamation, elocution and platform manners. If the wisdom of giving instruction in these items should be admitted, then who is to give the instruction? Obviously, that is the work of a specialist, of a graduate from a school of elocution. But if such a specialist should be put in charge of our classes, unless he were very well balanced, and remembered always that his students were training for addressing practical-minded people on practical themes, he would likely develop a showy oratorical style quite unsuited to the work before his students. And if instruction is left to those who are not specialists in elocution, it is obvious that many important defects in voice and manner must be passed over. That is the situation in which we find ourselves at present. No one who has been deputed to direct the public-speaking classes thus far pretends to have any special fitness for the work. Accordingly, instruction on the general principles of public speaking, and criticisms of actual performance, have been dictated by common sense only, and not aided by special knowledge. If this is to continue, then at least the public-speaking classes should be under the charge of one instructor, who, by general education and natural ability has shown himself capable, and he should be given time to make a special study of that branch. It is particularly important that this work be not discredited by the poor quality of the instruction and criticism given by the one in charge. Each student must feel that he has profited not only by his own effort, but also by the advice given.

The branch of English composition presents similar problems. Successive adaptations of this work to the needs of the students have compelled an attempt to give some definite instruction in journalism. Ordinary essay-writing, while a good preparation for the demands upon our graduates, is not specific enough for the purpose. Aside altogether from the work of agricultural journalism, in which many of our graduates are at present engaged, it is apparent that the term "journalism" best defines the sort of writing that our graduates should be expert in, namely, to present facts and views of current interest in a style and with an arrangement calculated to catch the busy man's attention and give him what he wants with the least possible expenditure of time and thought on his part. News writing, editorial writing, reports of meetings and fairs, reports of interviews, reports of agricultural conditions and prospects, summaries of bulletins and books, constitute in part the literary side of journalism. These exercises are different from the ordinary work in composition as that subject is presented in available text-books and taught in our secondary schools—different both as to subject-matter and style. To teach composition as journalism requires considerable adaptation of ordinary methods, and ingenuity in finding material. It can be done best by a good English scholar who has had some experience in journalism. At the University of Missouri, which I had the privilege of visiting last summer while the College was in session, the graduates in agriculture have the benefit of one year's instruction from the Faculty of the School of Journalism, which is affiliated with the University. Here we are attempting the work with our present staff, with an occasional lecture by a practical journalist.

This aim at technical instruction in public speaking and journalism is, I venture to submit, worthy of all reasonable encouragement and support. The large increase of attendance, especially in the higher classes, in the last two or three years, has made it necessary now, if this special work is to be done satisfactorily, to ask for increased assistance. At present Mr. Le Drew, Lecturer in Economics, takes the Second and Third years in composition and the Second Year in public speaking, Mr. Unwin, Dean of Residence, takes the First Year in composition and the Third Year in public speaking, besides some work in English literature. If Mr. Le Drew is to continue his assistance in the English department, as I hope he may, I recommend that he be given charge of the classes in public speaking. Also, I recommend that Mr. Unwin be appointed Lecturer in English, to take charge especially of the composition of the first three years. If he is to do that work effectively, he will require to be relieved of residence duties.

My appreciation of the work done by Mr. Le Drew and Mr. Unwin in the department of English is indicated by the recommendations I have made. Mr. Le Drew has been so successful in managing the Second Year class in public speaking that I think it would be advisable for him to continue that work with the same class in their Third year. He is a prize-man himself in one of our annual oratorical contests, and, besides being a good speaker, is clear and incisive as a critic. Mr. Unwin's knowledge of English, his general culture and natural aptitude as a teacher have made his assistance very valuable.

The amount of teaching required of me during the winter makes it difficult to do much outside work. Last winter I addressed a few evening meetings in connection with short courses at outside points. During the summer I gave a few Institute addresses. With the teachers' courses conducted at the College during the spring and summer, I gave a course of lectures on the Literature of Nature, eight lectures to the long course and five to the short course.

Respectfully submitted,

J. B. REYNOLDS.

PART III.

THE PROFESSOR OF ENTOMOLOGY AND ZOOLOGY.

To the President of the Ontario Agricultural College:

Sir,—I have the honour to present my fifth annual report on the work of the department of Entomology and Zoology.

The course of instruction laid down in the College Calendar has been faithfully carried out, and as it has not varied from the description given in last year's report, it is not necessary to repeat the details here. The steady growth of the classes in numbers has taxed our available space in lecture-room and laboratories to the utmost and the difficulties in maintaining good order and giving personal attention to the students have been greatly increased. Subdivision has been carried out as far as practicable, but in some cases it has been necessary to lecture to a whole year together, which involved the gathering in one room of nearly ninety young men—a number far too large for satisfactory oversight. Should the growth of the College continue to be maintained, it will soon become necessary to provide increased accommodation for the classes, both as regards lecture rooms and laboratories.

The number of Normal School students taking the Nature Study course from April to the end of June was considerably less than last year, and the work of instruction was therefore rendered much less difficult and onerous. The members of the class, on the whole, were greatly interested in this department of their work, and several of them, who are now in charge of country schools, are regularly corresponding with us in order to get assistance in the identification of specimens and information regarding interesting examples found by them or their pupils. It is always a pleasure in these cases to help the applicants in every way possible.

The Summer School of Ontario Teachers was more largely attended than during the previous year, and caused the month of July to be fully occupied with lectures, out-door instruction and the identification of the collections required to be made by those in attendance.

It is satisfactory to be able to state that all the Fourth Year students who had selected the Biological Option were successful at the final examinations for the degree of B. S. A. in May last. Of these Mr. J. D. Tothill has been appointed to take charge of the work at Melrose Heights, Mass., connected with the importation and breeding of Dipterous Parasites for the control of the Gypsy and Brown Tail Moths. This position was previously held by another of our graduates, Mr. W. Robin Thompson, who is now taking a post-graduate course at Cornell University. Mr. Roy Fraser has received an appointment on the staff of the College at Lawrence, Kansas, as assistant in the Department of Entomology. Mr. S. J. Neville is conducting farming operations at Cottonwood, Sask.

Of the present Fourth Year students five are taking the Biological Option, and four of these have selected Entomological subjects for the theses that they are required to present at the close of the year, and are now carrying on the scientific investigations necessary for the fulfilment of their tasks. Mr. A. C. Baker is making a monographical study of the Plant Lice (Aphididae); Mr. A. W. Baker is studying

the Mallophaga of Ontario; Mr. Vernon King is investigating the Saw Flies and their habits (Tenthredinidae); and Mr. W. A. Ross is investigating the habits and life-histories of the Spruce Gall Lice and other insects affecting this important tree.

In the Second Year more than twenty of the students have selected Entomological subjects for their theses, and in consequence are referring to us for assistance in planning and supplying materials for their work.

Outside Addresses and Demonstrations.

At the beginning of April, Prof. Jarvis went to Wiarton, where hibernated grasshoppers brought out by the unusually mild weather were reported to be very numerous, in order to investigate this unusual occurrence. For the last three years large sections of the County of Bruce have been so ravaged by grasshoppers that most crops were destroyed and not enough feed or hay could be grown for ordinary requirements. So great has been the loss and consequent discouragement that many farmers have abandoned their homesteads and gone to the Western Provinces, and now cultivation has ceased over large areas. Reforestation would probably be the best plan to adopt for utilizing these lands, which are no longer under cultivation. Later on in the month Prof. Jarvis was requested by the Superintendent to visit the grounds of the Mimico Asylum in order to give advice respecting the treatment advisable for the protection and improvement of the fruit and shade trees, ornamental shrubs, etc. His services were highly appreciated and the instructions given proved very satisfactory. In June a visit was made by Prof. Jarvis to the London Asylum to investigate an outbreak of caterpillars stripping the maple trees of their foliage. The depredator proved to be the Striped Maple-tree Worm. Instructions were given for the application of insecticides and a student was subsequently engaged during the vacation to carry out systematic spraying operations in the orchard and other parts of the premises.

Mr. Caesar gave addresses on insect pests, plant diseases, spray-mixtures and spraying at the following places: Picton, Cobourg, Port Hope, Oshawa, Owen Sound, Simcoe, Thornbury, Toronto, London, Georgetown, Norval, Clarkson and Millgrove. The meetings were well attended and the audiences were much interested.

Publications.

During the year now drawing to a close I have contributed my tenth annual "Bibliography of Canadian Entomology" to the Transactions of the Royal Society of Canada. Answers to enquiries regarding insects have been published from time to time in several agricultural journals.

Prof. Jarvis has contributed to the Annual Report of the Entomological Society of Ontario articles on "The Coccidae of Canada" and "The Aleyrodidae of Ontario." He has devoted during the year all the time at his disposal to research work in the study of animal parasites and the spread of diseases by Acarids to domestic and wild animals and man. He hopes to have the materials now collected ready for publication in the form of a Bulletin next year.

Mr. Caesar has contributed the following papers: "The Little Peach Disease," Bulletin 185, Ontario Agricultural College series; "Insects Attacking Vegetables," Vegetable Growers' Report, 1910; "Another Year's Experience with Lime-sulphur Versus Bordeaux Mixture," Fruit Growers' Report, 1910; "The Lesser Apple Worm," *Canadian Horticulturist;* "The Apple Maggot or Railroad Worm," *Farm*

and Dairy; "The Oyster-shell Scale and Blister Mite," *O. A. C. Review;* a series of nine papers on "The Chief Insect Pests and Diseases of Fruit Trees, Bush Fruits and Potatoes," followed by a Spray Calendar, *Farmers' Advocate;* "Insects of the Season," Annual Report of the Entomological Society of Ontario.

Mr. Caesar has been making a careful investigation for some time past into the life-history and habits of the Apple Codling Moth. There were many details regarding the insect that required to be cleared up and that could only be satisfactorily settled by close observation in the orchard and breeding under natural conditions. He is now preparing a Bulletin on the subject, and hopes very soon to have it completed for publication. Together with this work he has been studying the Plum Curculio and other insects injurious to fruits.

Farmers' Excursions and Fall Fairs.

The farmers' excursions to the College during the month of June were more largely attended than usual, and consequently the Information Bureau was thronged with visitors during the greater part of each day. Mr. Caesar and his student assistant were kept busy replying to enquiries and giving information respecting insect attacks, plant diseases and troublesome weeds. In this way he was brought into personal touch with a large number of intelligent farmers from all parts of the Province. In the autumn he took charge of the College exhibit at the Industrial Exhibition in Toronto, and was applied to all day long for information respecting the various objects shown. From this department exhibits were also sent to the fall fairs at Cobourg, Port Hope, Bowmanville, Simcoe and Petrolea. Mr. Caesar attended the first two of these fairs and Mr. W. A. Ross the third. The hard usage which the cases of necessity receive, and the length of time necessary to replace worn-out or injured specimens in the life-history cases, make it impossible to send exhibits to as many fairs as we should like.

The Entomological Society of Ontario held its 47th Annual Meeting here on the 3rd and 4th of November, under the presidency of Prof. Jarvis. The many papers read during the two days' proceedings were of a remarkably varied and interesting character, and the attendance of members from a distance was very gratifying. The usual popular lecture in Massey Hall was given by Prof. James G. Needham of Cornell University on "The Role of Insects in Water Life," illustrated with many excellent lantern pictures.

Correspondence.

The number of letters applying to this department for information respecting insect pests, fungus diseases of plants, spraying method and apparatus, etc., continues to increase year by year and helps us very materially in obtaining a knowledge of the troubles that affect farmers and fruit-growers throughout the Province. During the past season there have been no very serious outbreaks of insect injury, but the usual pests have been present in their ordinary numbers. The character of the season and other causes produce a diminution in the hosts of some species, while others may have met with more favorable conditions, and consequently have been present to an injurious extent. It thus comes about that certain pests which were very troublesome last year have not been complained of this year, while others that have been unnoticed for a time are once more brought into prominence by their unwonted abundance and the damage they commit.

Wireworms, White-grubs and Cutworms were, as usual, the subject of many complaints, while Aphids were seldom referred to except for a few cases of attacks

upon turnips and cabbage. From Toronto several complaints were received respecting injury in city gardens to all sorts of plants by Slugs. These nocturnal feeders are difficult to control, but may be kept in check by trapping, as they take shelter in the daytime wherever they can find a cool, damp place. Under bits of board or other material laid in such situations will be found in the morning many Slugs that have taken advantage of the cover. In hot, dry seasons they are not usually troublesome.

The Raspberry Twig-girdler was this year unusually abundant in many localities. The parent beetle bites through the bark about a foot or less from the end of a twig, making two complete girdles half an inch apart and in the space between deposits an egg. The girdling causes the end of the twig to die and break off and thus any further growth is prevented. The only remedy is to break off the affected twigs at the lower girdle and burn them, as soon as possible after the attack has been noticed.

The Pear-tree Slug, which is equally abundant on Cherry, was unusually destructive to the foliage of these trees. As the injury was chiefly caused by the second brood late in the season, the damage was not really serious. Spraying with arsenicals is the simplest remedy, which should be done as soon as the insect is noticed. Blister Mites were also much in evidence this year, and were the subjects of many enquiries. Scale insects of various kinds, the Buffalo Tree-hopper, Plum Curculio, etc., were the subjects of many letters.

The large Caterpillars of the Tomato Sphinx Moth were more than usually abundant; being so conspicuous, they can easily be got rid of by hand picking. Onion Maggots were little complained of and Flea-beetles in but few cases.

Numerous enquiries were made respecting the Buffalo Carpet Beetle, Bedbugs and Fleas among domestic insects; granary beetles and Pea-weevils in stored products; ants' nests and earthworms in bowling greens; boring insects in maple and other shade trees and the gall-lice on spruces; mealy bugs, white flies and red spiders on hothouse and indoor plants; and parasites of various kinds affecting domestic animals and poultry. Such in brief are examples of the enquiries that are made and serve to show how wide a field is covered.

Insect Pests.

During the year Mr. Caesar has had charge of both the lectures and field work in Economic Entomology. This, along with the field work in plant diseases, brings him into close touch with the fruit-growers and farmers of the Province. In consequence there is each year an increasing amount of correspondence on these subjects. In order to be of further service to the fruit-growers, he gives addresses at Fruit Institutes and Short Courses in Horticulture as often as his College lecture work will permit, and in the summer assists in orchard demonstration meetings, and inspects orchards whenever requested to do so. Most of his time, however, in the summer is devoted to investigation work and spraying experiments. During the last two years the life-history of the Codling Moth and methods of control have been the chief subjects of investigation. As a Bulletin on the subject is in course of preparation and will, it is hoped, be published before next season's operations begin, there is no necessity for entering into the details of this work here.

Other insect pests whose life-history and treatment have received considerable attention during the year are the Lesser Apple Worm, Apple Maggot or Railroad Worm, Plum Curculio, Cherry Fruit-Fly, Spruce Gall Lice and certain little known species of insects that attack apples early in the season.

In testing methods of control for the various kinds of insects an attempt is being made to secure a number of careful co-operators among the fruitgrowers and farmers themselves, who will carry out the instructions given and report the results. The different district representatives are also giving much assistance in this way, especially as their experiments are usually more carefully carried out and the results more accurately estimated than those of the average fruit-grower. It is largely by this sort of co-operation between the farmers, the district representatives in the different counties and our department that we hope for a great increase in the careful spraying of orchards and the adoption of better methods of control of insects and diseases. Much progress is being made in this respect. The rapidly increasing prestige of this department and the readiness shown by so many fruitgrowers to follow the instructions given have been a source of much encouragement and inspiration to us in our work.

Spraying Experiments.

In connection with the study of pests and diseases further tests have been made of the lime-sulphur wash in the concentrated form, both home-made and commercial, and of the use of arsenicals with it. These tests have been on a considerable scale, two orchards and part of a third being treated and the results compared with those obtained in other parts of the Province by the district representatives and others. The following is a brief summary of the results:—

(1) The concentrated lime-sulphur, whether home-made or commercial, gives excellent results as a spring wash, just before the buds burst, apparently just about as good as the old form of home-boiled (20, 15, 40 formula), and controls Blister Mite, San Jose Scale and Oyster-Shell Scale satisfactorily. It also seems to be just as satisfactory at this time of year as a fungicide as Bordeaux mixture.

(2) This same kind of lime-sulphur wash, when properly diluted for a summer spray, will control Apple and Pear Scab, apparently as well as Bordeaux mixture.

(3) The lime-sulphur wash remains on the foliage and fruit about as well as Bordeaux.

(4) When diluted about 1 to 35 it is as cheap as Bordeaux mixture.

(5) The addition of arsenate of lead to lime-sulphur brings about a chemical change, but the new compounds thus formed give just as satisfactory insecticidal and fungicidal results as if the two substances were applied separately, and there is apparently less danger of injury to the foliage than from the lime-sulphur alone.

(6) Arsenate of lead is the only insecticide that is known to be safe to use with lime-sulphur. Either arsenite of lime or Paris green, if combined with it, is liable to cause serious injury to the foliage and sometimes to the fruit; especially is this the case in the spraying for the Codling Moth and in later sprayings.

Plant Diseases.

The report of this branch of work would come naturally under the heading of Plant Pathology, but for the sake of convenience is included here.

In addition to the identification of a large number of specimens of plant diseases sent in to him from various parts of the Province and of British Columbia and Nova Scotia, Mr. Caesar has, as indicated above, made several thorough tests of the value of the home-made and commercial forms of concentrated lime-sulphur as a fungicide for orchard fungus diseases, and found it to possess as nearly as can

be judged equal merit with Bordeaux mixture. The latter, however, has in some cases the objectionable feature of causing considerable russeting of the fruit of apples.

Observations have also been made through the assistance of Messrs. King and Clement on the value of this wash compared with the ordinary home-boiled lime-sulphur (20, 15, 40 formula), as a remedy for the Peach Leaf Curl. These two men made a survey of most of the Niagara peach belt and made careful inquiries to get at the facts, and they report excellent results from this form of the wash, as good or almost as good as the old form of lime-sulphur. Where there was failure to control the disease, it was found on investigation to be due either to lack of thoroughness or to spraying too late. Experience has proved that for Leaf Curl the application should be made before the buds begin to swell. If it is left off until they are ready to burst it will not control the disease, especially in years so favorable for it as 1909 and 1910.

Some tests have been made on the value of lime-sulphur as a spray for Currant Leaf Spot. While these results look very promising it is not safe to speak definitely without another season's work.

During the months of August and September it was observed by peach growers in part of the Niagara district that the Little Peach disease, which had been neglected by certain fruit-growers, was making rapid progress. Feeling that it was a serious matter they requested Mr. Caesar to aid them. The results of his investigations have just been published in Bulletin 185.

Several orchards at the requests of the growers have been inspected for what they called a "Blight" on the leaves. In most cases this proved to be Apple Scab, which, owing to the wet, cold spring, was exceptionally severe this season and in some cases nearly defoliated the trees. In two or three cases the injury to the leaves seemed not to be caused by any fungus or bacteria, but solely by the unfavorable weather in May and June. Later in the season these trees looked quite healthy.

As the problem of winter injury is of much importance in Ontario and as there was not sufficient known about it, Mr. Caesar took a trip through the districts east of Toronto, as far as Montreal and Ottawa, visiting many orchards here and there along the route. He found that certain varieties of apples were quite unsuited for the district in which they were grown and consequently suffered much from winter injury, including under this head Sunscald. In most cases the Black Rot Canker had followed this weakening of the trees and greatly increased the injury. As far east as to Trenton there was a considerable number of cases of Collar Rot or Crown Rot; that is, the dying and rotting of the bark of trees just at the ground. Many Spy trees, and a few other varieties, were being killed in this way. Farther east from Maitland to Montreal and Ottawa this trouble was not at all common, and fruit-growers were almost entirely unacquainted with it. In even the coldest districts visited he found that there were certain very hardy trees almost totally free from any form of winter injury. The chief of these were Fameuse (Snows), McIntosh Red, Wolfe River, McMahon White, and Scarlet Pippin. Others not quite so hardy, yet much hardier than the average, were Duchess and Tolman Sweet. If fruit-growers in these colder parts of the Province had chosen only these or other varieties that are known to be equally hardy it would have prevented much loss and discouragement to them.

Towards the end of August a request was sent in for the inspection of the cucumber plants around Clarkson. On examination it was found that a considerable

number of these had been attacked by the Cucumber Wilt, a bacterial disease. The growers were advised to pull and burn at once all the diseased plants and endeavor to destroy the Cucumber Beetles by spraying with poisoned Bordeaux, because these insects are the chief spreaders of this disease. In one field, however, the trouble seemed to be due to a tiny sucking insect, the identity of which has not yet been determined. This insect attacked the stems just at the ground and caused the parts above to wilt. A thorough spraying around the base of the stem with kerosene emulsion and whale oil soap was recommended.

The Museum.

The large collection of objects of interest of various kinds, accumulated during a number of years by Capt. Spain, of Port Dover, has been recently purchased, and will be placed on exhibition early in the coming year. A very interesting collection sent by the Department of Agriculture at Kingston, Jamaica, to the Toronto Industrial Exhibit has also been procured and will soon be arranged for inspection. Additions are continually being made to the collections of wax fruits, especially examples of insect and fungus injuries.

Apparatus.

In addition to the ordinary materials for the laboratories there have been added to the equipment two Greenough's Stereo-binocular Microscopes made in Vienna, and two Edinburgh Student's Microscopes from London; an excellent binocular Fieldglass for bird observation; an Aquarium and a number of Riker mounts for lecture and exhibition purposes.

In conclusion I wish to testify to the valuable and energetic work performed by my colleagues, Professor Tennyson D. Jarvis and Mr. Lawson Caesar, not only in carrying out the various courses of instruction, but also in the performance of the many and varied other duties which devolve upon us, both in the College and in connection with the public outside.

Respectfully submitted,

CHARLES J. S. BETHUNE.

PART IV.

THE PROFESSOR OF BOTANY.

To the President of the Ontario Agricultural College:

SIR,—I have the honour to submit my fourth annual report for the department of Botany.

Owing to the increase of work in the Nature Study Department demanding most of my interest and time, the work of this department has again been very largely in charge of Messrs. Eastham and Howitt. My share of the teaching is restricted to the instruction of two sections of First Year classes in the elements of Botany, the Third Year in Physiology and Histology, and the Fourth Year in Physiology, while they have charge of all the other classes as well as the departmental work and correspondence.

For their progressiveness, readiness to serve, and teaching ability, I take pleasure in making full acknowledgment. Both gentlemen have spared neither effort nor expense in further preparing themselves for their work. Mr. Eastham returned from Cornell University in July, after a year's post-graduate work in Plant Physiology and Plant Pathology. Mr. Howitt spent his summer holidays at the Graduate School of Agriculture, held at the Agricultural College at Ames, Iowa, taking special instruction in Physiology and Pathology also. Mr. A. Eastham, '09, who filled his brother's position during his absence at Cornell, with satisfaction and efficiency, has taken a position in the Seed Division of the Dominion Department of Agriculture, and is stationed at Calgary as weed seed expert.

The work of the department is not by any means restricted to the regular class work of the College. The short courses make considerable demand on its services. Our staff takes a very large share of the work with the teachers' normal and summer classes, as outdoor plant studies of weeds, flowers, trees, weed seed work, etc., is such an important part of the teacher's preparation for taking up agricultural Nature Study in the country schools. Mr. Howitt takes charge also of the weed seed work in the farmers' short course in January. In the summer months there is investigational and experimental work carried on as well along the line of treatments for weed-eradication and prevention of plant diseases. A revision of Bulletin 128, "The Weeds of Ontario," is being made at present by Mr. Howitt. It will appear as No. 188.

The equipment of the department has been enhanced during the year by the addition of fifteen microscopes and a micro-camera. The additional instruments permit us now to take the microscopic work in our Third and Fourth Year classes with increased satisfaction. The micro-camera has been found very useful in securing the enlarged photographs of weed seeds required for illustrations.

The correspondence of the department for 1910 shows a further increase, indicating a growing interest on the part of farmers, seed merchants, teachers and others in the detection of seed impurities, the identification of weeds, poisonous plants, and plant diseases. We endeavour to meet all enquiries concerning these matters promptly, although they often encroach on the time required for the classes and necessitate special investigation.

The remainder of this report, dealing with special matters relating to weeds and plant diseases, has been prepared by Mr. Howitt and Mr. Eastham.

WEEDS.

An analysis of the correspondence received during the past twelve months indicates that the following have been the most troublesome weeds for the season 1909-10: Field Bindweed (*Convolvulus arvensis*); Field Mustard (*Brassica arvensis*); Perennial Sow Thistle (*Sonchus arvensis*); Bladder Campion (*Silene latifolia*); Twitch Grass (*Agropyron repens*); Cow Cress (*Lepidium campestre*); Rough-fruited Cinquefoil (*Potentilla recta*); Alfalfa Dodder (*Cuscuta* sp.); and Wild Tare (*Vicia cracca*).

Such a large number of enquiries were received concerning the eradication of Field Bindweed that a circular letter was prepared giving a brief description of this pest and outlining methods for controlling it. A copy of this circular was sent to all who enquired about Field Bindweed and is included here in the hope that it may reach others to whom the information it contains may be of value.

Field Bindweed (*Convolvulus arvensis*).

This is a perennial weed introduced from Europe. It is deep rooted, with extensive, creeping, cord-like, fleshy root-stocks. These throw out numerous slender, twining, smooth stems, which form thick mats on the surface of the land and twist around any plants growing within reach, using them as supports and choking them out. Leaves—about 1 to 1½ inches long, on slender stalks; ovate or heart-shaped, arrow-shaped at the base; flower stalks slender, about the same length as the leaves, provided with small leaves at some distance below the large, open, funnel-shaped, pink flowers, which are over an inch across. Fruit—a round, two-celled capsule, containing three or four brown seeds.

Injury.—Exceedingly hard to eradicate once it becomes established. The creeping root-stocks, if broken up, grow at the joints and produce new plants.

Remedy.—Small patches may be destroyed by digging them over carefully and removing the root-stocks. Then apply a heavy covering of short cut straw or lawn grass clippings; this should be about a foot or more in depth and well tramped down, and a little earth thrown on top. The patch must be watched and, if any of the Bindweed is noticed growing up through the covering or out around the edges, it must be pulled.

In large patches this weed is exceedingly difficult to eradicate and careless cultivation only increases the trouble by carrying the "roots" from place to place. Salting is recommended by some practical farmers who have succeeded in eradicating this very troublesome pest, but we cannot speak from experience as to the value of this method of treatment.

The weed can be kept in check by the frequent introduction of well-cared-for hoed crops into the rotation, and the shorter the rotation the better. The later sown hoed crops, especially rape, are more effectual than those sown earlier in the season. Before the hoed crop is sown the weed may be kept in check by going frequently over the field with a broad-shared cultivator, so as to cut all the plants an inch or two below the surface without bringing up any of the creeping root-stocks. About the first of July the land may be sown with pasture rape in low ridges about 26 inches apart, using a pound and a half of seed per acre, and during the early growth of the crop the weed may be kept in check by means of the cultivator and more or less hand hoeing. If the land has been well manured or is naturally rich in vegetable matter and the seed is sown when the soil is moist so that it gets an early start, the rape will make a rank growth and smother some of

the weeds. The rape may be pastured in the fall, and in some cases may be followed by another hoed crop, such as corn. If the corn is well cultivated and hoed most, perhaps all, of the plants will be destroyed.

In some cases it may be advisable to summer fallow, and in such cases it is best not to plough more than is absolutely necessary, but to depend mainly on the broad-shared cultivator. Buckwheat sown on summer fallow and ploughed under when coming into bloom, followed by surface cultivation with a broad-shared cultivator, will assist very much in killing the weed. If necessary, the summer fallow may be followed by a hoed crop.

Recent Introductions.

Rocket or Roquette (*Eruca sativa*). This weed has been mentioned in our last two annual reports, but as it continues to be reported from new localities throughout the Province, it is again discussed. It has been spread throughout Ontario as an impurity in alfalfa seed, and some idea of its wide distribution may be had from the fact that it was sent in for identification from the following places in Ontario: Kingsbridge, Mono Road, Paisley, Tiverton, Parkhead, East Linton, Walton, Chatsworth, Norwich, St. Mary's, Waldemar and Thames Road.

Rocket or Salad Rocket in habit resembles Wild Mustard, but is a more vigorous and taller growing plant. It can be easily distinguished from Mustard by the distinct dark purple veining of the petals and by the pods, of which the upper third is a flat, empty beak.

As this plant has been introduced so recently we have little indication as to whether it is likely to prove a bad weed or not. It is not considered a bad weed in its native country, but that is not very safe ground for us to go upon, since some of our worst weeds are of little importance in the country of their origin. So far we have no information as to the persistence of the weed after the breaking up of the alfalfa and the putting in of a hoed crop. We should be glad if those whose attention is called to the matter would make observations as to this, and so extend our exact knowledge of the habits of the plant.

Since it is a close relation of the Wild Mustard and is evidently a free seeder, we think it advisable that farmers should take due precautions against it. We would recommend hand pulling before it goes to seed if it is present only in small quantity in grain. When in the hay crop and more numerous, we would recommend cutting the alfalfa before the seeds of the Rocket can mature. The plant is an annual, and if kept from seeding must rapidly die out. Too great care cannot be exercised in selecting seed free from the seeds of this weed. Farm seed should be either bought under guarantee of purity or a sample of it sent to be examined for purity at the Botanical department here, or at the Seed Commissioner's Laboratory, Ottawa. Such tests are made without charge.

Pineapple Weed (*Matricaria suaveolens*). This plant has recently become established in the vicinity of Guelph, and is now of very common occurrence on roadsides and in waste places. Its insignificant appearance and its close resemblance to common Mayweed (*Anthemis cotula*) are probably responsible for the fact that it had not been recorded prior to last year. It can, however, be easily distinguished from the common Mayweed by its rayless heads and its distinct sweet odor when bruised. It is an annual plant and not likely to become a weed in cultivated crops.

Yellow or Small Alyssum (*Alyssum alyssoides*). Though this plant is recorded as growing in Ontario, it is by no means common, and it was therefore a surprise to have it sent in for identification from Drumbo, Oxford County, where

it was found growing as a weed. It is a low growing, bushy branched, densely hoary annual plant with narrow leaves and small yellowish-white flowers in long terminal clusters (*racemes*). The fruit is a small, orbicular pod notched at the upper end and with two seeds in each cell. This plant, being an annual, should not prove troublesome if care is taken not to let it go to seed.

Other recently introduced weeds which seem to be gaining ground in Ontario are: Barnaby's Thistle (*Centaurea solstitialis*); Gum-weed (*Grindelia squarrosa*); Ball Mustard (*Neslia paniculata*); Cow Cockle (*Saponaria vaccaria*); Tumbling Mustard (*Sisymbrium altissimum*); Cow Cress (*Lepidium campestre*), and Colt's Foot or Coughwort (*Tussilago farfara*)

Fungi and Plant Pathology.

During the past year an increasing number of enquiries have been received dealing with these subjects. Some of these have been requests for identification of fleshy fungi of various kinds, and for information as to the edible or poisonous nature of mushrooms, while the remainder were on pathological matters. The following are amongst the diseases on which information was supplied: Loose Smut of Wheat (*Ustilago tritici*); Stinking Smut of Wheat (*Tilletia foetens*); Naked Smut of Barley (*Ustilago nuda*); Black Rot of Apples (*Sphaeropsis malorum*); Apple Scab (*Venturia inaequalis*); Black Heart of Apple Trees, Late Blight of Potato (*Phytophthora infestans*); Potato Scab (*Oospora scabies*); Blackleg, Tip-burn and storage rots of Potato, Brown Rot of Plums (*Sclerotinia fructigena*); Rust of Hollyhock (*Puccinia malvacearum*); White Rust of Salsify (*Cystopus tragopoginis*); Damping off (*Rhizoctonia*) and Root Rot (*Thelavia basicola*) of Tobacco, Downy Mildew of Grape (*Plasmopara viticola*); Leaf Blight of Celery (*Cercospora apii*); Powdery Mildew of Cherry (*Podosphaera oxyacanthae*); Leaf Blotch of Maple (*Rhytisma acerinum*) and of Elm (*Dothidella ulmea*). Most of the more important of these are dealt with, sufficiently in the various College Bulletins, and it is not necessary to discuss them here. Notes on one or two diseases which seem to call for a little further notice are given below.

Unfortunately, it has not been possible as yet to fit up in the department the equipment necessary for the carrying on of pathological investigation on modern lines. It is difficult to do this with any degree of satisfaction when every available foot of space is already demanded for instruction purposes. It is hoped, however, during the coming year to instal an autoclave and sterilizing ovens, incubators and such other apparatus as will enable a certain amount of culture and inoculation work to be carried on at any rate during the absence of the regular classes.

Black Rot of Apple.

(*Sphaeropsis malorum*).—An account of this disease and its prevalence in Ontario will be found in the report for last year. That account was based on the investigations in the Province of Mr. A. Eastham, who devoted a summer specially to this disease. During the past season the opportunity presented itself of undertaking an experiment in the control of the disease in the apple orchard of the Asylum, London, Ontario. The cankers were carefully cut out, disinfected with corrosive sublimate (1 in 1000) and painted over. For this last operation lead paint was at first employed and subsequently coal tar. This latter was found to give better protection in not cracking or blistering, and no injurious effect has been noticed from its use. This cutting out of cankers was supplemented by lime-sulphur sprayings for control of Apple Scab, and it is hoped that the experiment so begun, will give us some definite results in the control of the disease.

Loose Smut of Wheat.

(*Ustilago tritici*).—Judging from letters we have received during the year there appears to be some confusion in the minds of many farmers as to the nature of Smut and the occurrence of two different kinds: Stinking Smut and Loose Smut. A brief account of these troubles may therefore be desirable.

Stinking Smut.—This is the more objectionable of the two forms. Spores of the fungus are sown with the seed grain, germinate and infect the young shoot. The fungus keeps near the tips of the shoots until the grain begins to form. It then grows up into the developing grain and multiplies enormously, breaking up into a dark mass of spores, which fill the grain entirely, forming the so-called "Smut-ball." This spore mass remains covered by the ordinary shell or outside layers of the kernel so that an attacked kernel may not differ strikingly from a healthy one. It is, however, more or less swollen and on crushing it the greasy, vile smelling, dark colored spore mass is disclosed. The swollen character of the grain enables the attacked ears to be easily detected since it causes the chaff to be pushed open, giving rise to a slight, but distinct difference in the appearance of the ear.

Loose Smut.—This is not so objectionable as the last, since the spores have not the same bad odor. As the name indicates, the spores are borne loosely on the ear, the chaff and kernels being broken up and letting the black powdery spores free. Before harvest all that remains of such an ear is the central stalk—spores, chaff and kernel remnants having been blown away. This form of smut, though not as destructive as a really bad attack of the last, does cause an appreciable loss. What is most important to remember is that seed treatment with bluestone or formalin, such as is satisfactory for Stinking Smut or Loose Smut of Oats, is of no use for Loose Smut of Wheat. Infection in this case does not take place through spores sown with the seed, and which would be destroyed by such treatment. The loose spores are blown by the wind between the scales, (chaff), which enclose the flowers of neighboring ears, just as those flowers are maturing. The spore germinates and the fungus enters the young kernel, remaining dormant in the germ of the seed until the seed is sown. Now it starts into activity, and its future behavior is identical with that of Stinking Smut. It will be understood from this why the external application of a chemical substance is useless, the fungus being inside the seed. The only treatment yet devised for this disease is that of soaking the seed in water to start the fungus into activity, followed by immersion for a few minutes in hot water. This kills this fungus, together with a certain percentage of the seed grain.

The following detailed method is one tried successfully by the U. S. Department of Agriculture (Bur. Plant Ind., Bull. 152), for Loose Smut of both wheat and barley, which are similar in their behavior.

"The clean seed should be soaked for from five to seven hours in water at ordinary room temperature (63 to 72° F.). It should be placed in small loose sacks or wire baskets containing not more than one-half peck each and drained for a short time. It is of the greatest importance that the seed be treated in small lots in order that all of the grain may be quickly and uniformly brought to the desired temperature. Two tubs or vats of water should be provided. In one tub (No. 2) the exact temperature required should be maintained. The other tub (No. 1) is used for bringing the grain to the temperature of the treatment, so as not to lower the temperature in tub No. 2. Galvanized iron tubs of 20 to 40 gallons capacity and kerosene or gasoline double-burner stoves are sufficient for treatment. The drained sacks or baskets of seed should be plunged into tub No. 1 for a minute, then transferred to tub No. 2, and kept agitated while immersed at temperatures and for the periods specified below, the temperatures mentioned being maintained as nearly as possible:

For barley, 15 minutes at 125° F.
For wheat, 10 minutes at 129° F.

"In treating barley, if the temperature should rise above 126° F. the time of immersion must be reduced to ten minutes at 127°F., or five minutes at 129° F. Above 129° F. there is no safe margin. If the temperature falls slightly below 126° F. time of treatment should be increased in proportion. A temperature lower than 124° F. will not be effective. In treating wheat, if the temperature should rise above 129° F. or fall below 126° F, the time for immersion must be diminished or increased accordingly. Under no circumstances should a temperature of more than 131° F. be allowed. Temperatures below 124° F. are ineffective.

"Seed treated as indicated may be planted as soon as it is sufficiently dry to run freely through the drills. Allowance must then be made for the swollen seed and also for injury in treatment. The increase due to swollen seed can be estimated by measuring seed before and after treatment. The seed may be treated several months before seeding time and then dried quickly and carefully. In many cases the grain germinates as well or better when rested after treatment than if sown immediately. The seed may be dried by spreading it out in thin layers not over 2 inches in depth on a clean granary floor or on canvas and shoveling or raking it from time to time. It must not be allowed to sprout."

This treatment is effective against both smuts, but is a rather delicate one to carry out. Should the grain get too hot its germinating power will be injured or destroyed; if the temperature is not high enough the disease will not be reduced at all. It cannot, therefore, be recommended for farm practice for the seed required for the main wheat crop. It is, however, possible to treat a small quantity of seed in this way and with it sow a plot from which to get next year's seed for the main crop. The location for such a plot should be as far as possible from the other wheat fields, and if possible in a sheltered situation so as to avoid the blowing of smut spores in any quantity to the flowers. If the seed grain was successfully treated very few smutted heads should be found in this seed plot, and such as appear should be removed by hand. The grain harvested from this plot should have escaped most of the infection and will yield a comparatively smut-free crop wherever it may be sown and without any further seed treatment.

INVESTIGATIONAL WORK.

Owing to ever increasing academic duties the time available for such work becomes less each year, and hence it is impossible to investigate very many important topics which come under the scope of this department. Time, however, has been found during the past year to take up some of the more important problems, viz.: spraying to destroy mustard, impurities of clover seed, spraying for apple scab, and insect and bean diseases of Kent County.

Mustard Spraying Experiments.

For some years this department has been testing the efficiency of iron sulphate and copper sulphate to destroy mustard, and the results of these experiments are to be found in previous reports. These results show that both substances may be used successfully to destroy mustard in grain crops, but on the whole iron sulphate gives the most satisfactory results. In order to further demonstrate the efficiency of iron sulphate, and to test a broad cast sprayer for this work, an experiment was conducted on the farm of Mr. John Hohenadel, Puslinch Township. This experiment partook of the nature of a public demonstration, all the farmers of the neighborhood being invited to attend and see for themselves how the work was done and the results. A goodly number of the farmers availed themselves of this opportunity and seemed very interested in the whole proceedings.

Fig. 1.—The mustard in the field before spraying.

Fig. 2.—Farmers receiving instructions about spraying mustard.

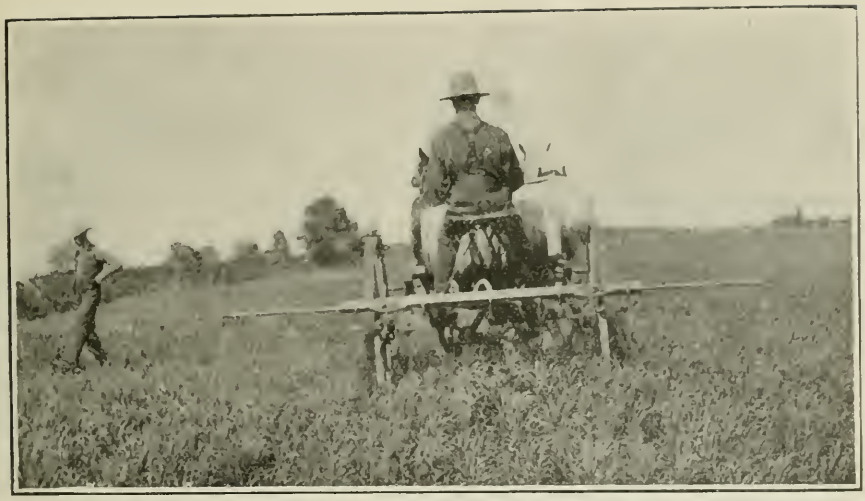

Fig. 3.—Spraying mustard with a potato sprayer fitted with a broadcast attachment.

Fig. 4.—A good machine for spraying large orchards with big trees.

The solution of iron sulphate or copperas used was of the ordinary strength, viz.: 80 lbs. of iron sulphate to 40 gallons of water. An Aspinwall potato sprayer with a special broadcast attachment was used to apply the solution with. This special attachment consisted of a rod about 10 feet 9 inches long, with 9 nozzles, 16 inches apart arranged along it. With such a wide row of nozzles it took but a very short time to cover an acre. The machine worked splendidly, but the nozzles were hardly high enough from the ground to allow the spray to spread out sufficiently, to thoroughly cover all the plants. This difficulty, however, is one that could be easily overcome. About 8 acres in all were sprayed. The mustard was exceedingly thick, making it almost impossible to see the oat crop in which it was growing. The result of the experiment may best be judged from the following letter from Mr. Hohenadel: "The experiment in spraying mustard was a great success; the results were most satisfactory. In my opinion the treatment is very effective, killing every plant, no matter how thick they stood. In regard to the oat crop it did not injure it in the least."

Alfalfa and Clover Seed Investigations.

This work has been under way for the last three years, and reports of progress are to be found in the last two annual reports. During the past year a considerable number of new weed seeds have been found in alfalfa seed. Descriptions and photographs of these have been made with the intention of using them in a bulletin, which it is hoped may be published shortly, giving the full results of the investigations into the purity of alfalfa and clover seed in Ontario. During the present year Mr. C. A. Galbraith, a fourth year student, has charge of this work as he is preparing a thesis on this subject.

Spraying for Apple Scab.

In co-operation with the authorities in charge of the Hospital for the Insane, London, Ontario, an experiment was carried on to test the efficiency of lime-sulphur to control apple scab and black rot in a large orchard which had never been sprayed before, and consequently had become badly infested with these diseases. Three sprayings were given, the first with home-boiled lime-sulphur early in the spring before the leaf buds had burst; the second spraying was given just as the blossom buds were opening; and the third when the blossoms were falling. For the last two sprayings commercial brand lime-sulphur, 1 to 30, was used, arsenate of lead being used as an insecticide. The results were highly satisfactory. When the apples were gathered in the fall 90 per cent. at least were free from scab, and very few were found showing signs of black rot. Other orchards in the neighborhood which had not been sprayed were badly attacked by scab.

Investigation of the Diseases and Insects of Beans in Kent County.

In co-operation with the Bean Growers' Association of Kent County, this department carried on an investigation to ascertain the chief insects and fungus diseases injuring the bean crop in Kent County, with the object of obtaining as much information as possible as to their nature, and practical methods for their control. For this purpose the writer made several trips to Kent County, drove through a large portion of the bean growing section of the county, and, thanks to the kindness and help of the members of the Bean Growers' Association, was able to make observations and studies, the results of which should be of interest to all bean growers.

Insect Pests.

The first trip was made during the third week in June. The chief insect pest observed was the little white maggot, which every year does a large amount of damage to the germinating beans, and the seedlings. Some fields of beans that were sown this year failed to come up properly on accour of this pest, while in other fields a large number of seedlings were noted with blackened stubs, and here and there throughout all the fields plants with the true leaves well formed would be seen drooping and dying. When the beans that had failed to germinate properly were dug up, a number of the small white maggots were found feeding upon the cotyledons. On examination the blackened stubs were found to have the cotyledons destroyed by the same maggot, and an inspection of the drooping older plants revealed a maggot boring up through the stem of each one, and thus destroying it. A large number of small flies were noticed flying over the beans in many of the fields. Suspicion was at once aroused that these were the flies that laid the eggs from which the maggots hatched. A number of the flies were caught, and have since been identified as the adults of the maggots. A number of the maggots were also taken and kept in glass vials. They very soon pupated, and in less than three weeks flies identical with those found in the bean fields emerged. From these observations and a careful examination of the insect in all the stages of its life cycle, it has been possible to identify it as the Bean Fly or the Corn Seed Maggot, as it is often called, on account of the damage it often does to germinating seed corn.

The Bean Fly (*Pegomya fusiceps*).

This is the latest pest which has caused so much trouble to growers in Kent County. It has done considerable damage for many years in Ontario, to both corn and beans. In 1900 it is reported as having done very serious damage in Lambton County. In Kent County it has been confused with the bean weevil, which is a very different insect and which so far as the writer has been able to ascertain, has never been bad in Kent County. The bean fly looks very much like a small house fly. Large numbers of these little flies may be seen upon the bean plants in June. There are probably two broods in the bean fields each year. It is thought that the insect passes the winter in the fly or pupa, and that in the spring the flies lay their eggs upon decaying matter in the soil, and when the maggots hatch they find their way to the seed beans or seedling plants. The writer found as many as ten maggots feeding upon a single seed. After the maggots cease feeding, they change to a little light brown, barrel-shaped pupae, about a quarter of an inch long. From these pupae the flies emerge in about two weeks.

Remedies.

These are chiefly practising methods of prevention. Planting the beans at the right time, and at the proper depth, in order to insure a quick start, seems to be one of the ways to prevent the ravages of this pest. Anything which retards germination, such as cold, wet weather, shortly after planting, or covering the seed too deeply, gives the maggots a chance to get started in the seed, and to prevent its proper germination. As the maggots breed in decaying matter, the application of farmyard manure increases their number, and the substitution of commercial fertilizers is often advised, but not always practicable. If the fly becomes very serious in a field, it will often be advisable to stop growing beans in that field for a number of years in order to get rid of the pest. These methods of prevention are not altogether satisfactory, and it seems to the writer that this would be a good field of investigation for the members of the Bean Growers' Association.

Other Insects.

In June, when the trip of inspection was made, no other insects were apparently doing any serious harm, though quite a number of different kinds were noted upon the young bean plants. One of these was a small black active beetle, known as a flea beetle, on account of its jumping habit. These beetles were not very numerous, but in some fields some of the young leaves of the bean plant had been riddled with little holes by this pest. The white grub was also noticed to have done some slight damage to the bean plants. In some of the fields visited here and there a wilted plant would be observed, and when the earth was dug away from the roots the familiar large white grub would be found feeding upon them. Cutworms at this time were not doing any noticeable harm, though a few plants were seen to have been cut off by them.

Bean Diseases.

The only disease observed to be doing any serious harm, was the Bean Anthracnose or Pod Spot (*Colletotrichum Lindemuthianum*). In several of the fields examined, blackened and withered stubs were observed, and at a glance the trouble seemed to be the Bean Fly Maggot, previously mentioned, but a closer inspection revealed the fact that the cotyledons of many of these blackened stubs had not been eaten by the bean maggot, but were seriously damaged by the fungus which causes the pod spot. As far as is known this fungus winters over only in the seed. Infected seeds may usually be detected by the brown or yellowish discoloration of the seed coat. When infected seeds are sown and germinate, the fungus starts into active growth, and is first observed on the young seedlings, causing brown, sunken, discolored spots on the seed-leaves, or stem. Sometimes many of the seedlings are destroyed at this stage, and are seen in the rows as the blackened stubs mentioned above. As the young plants develop, the fungus spreads from the stem, and seed leaves on to the true leaves, and when the young pods are formed they are attacked and conspicuous, round, black or brown, sunken spots appear on them. The disease makes its way through the pods, and into the seeds, where it lies dormant over the winter. This disease does a large amount of damage in several ways. First: It often destroys many of the seedlings, and thus causes a poor stand, and the writer believes that seedlings attacked by this disease are more likely to be destroyed by the Bean Fly Maggot. Secondly: It destroys the stems and leaves, and thus reduces very materially the yield. Thirdly: It causes a large amount of shrunken and discolored beans to the bushel, and hence reduces their market value.

Control.—In field culture spraying has not proved a practical method of dealing with the disease. The fungus winters over in the seed, and if clean seed is sown there will be no disease. The problem then is how to obtain clean seed. Hand picking of the seed will not eliminate all the disease, as even with the most careful picking, some of the slightly discolored seeds will be missed. This was proved by Professor Whetzel of Cornell University. As has been previously stated, the disease works its way through the pods into the seeds. Clean pods therefore contain clean seeds. The writer would advise the growers in harvesting to put aside the cleanest portion of their crop, from which to hand pick clean pods to obtain seed from. This clean seed can be sown in a seed plot, from which to obtain clean seed the next year for the general crop.

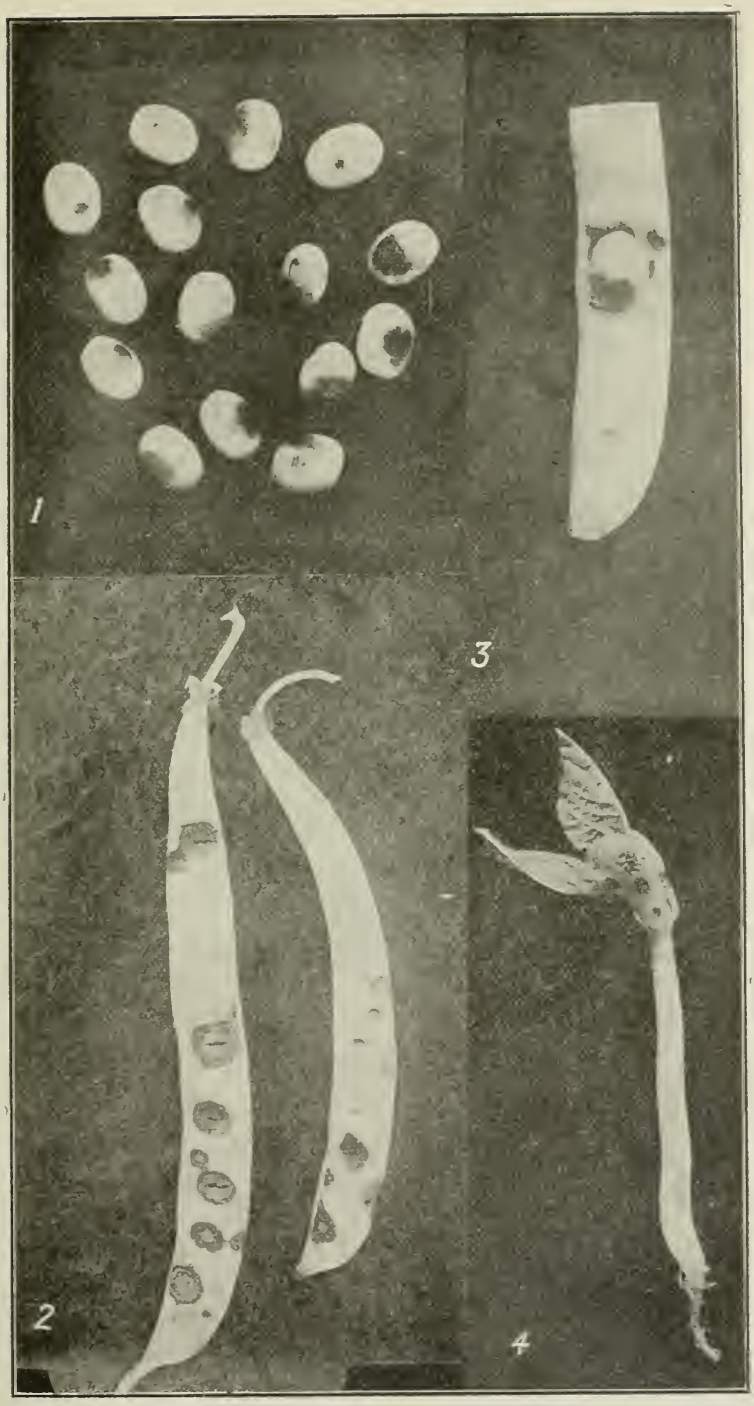

Fig. 5.—Pod Spot, or Bean Anthracnose on seeds, seedlings and pods.

(Kindness of Professor Whetzel, Cornell University.)

The second trip to Kent County was made on July 16th. The chief object of the trip was to see what were the most serious diseases of beans this year. In driving along the roads a glance into many of the fields was sufficient to convince anyone that something was wrong with the bean plants, as many of them were yellow, brown and withered, and the whole crop often had an unthrifty appearance. A closer examination of the diseased plants showed the chief cause of the unhealthy appearance of the crop was the Bacterial Blight of Beans. This disease appeared to be very prevalent this year and to be the chief disease injuring the bean crop. In every field some plants were found affected by it, while in some it was doing a large amount of damage by destroying many of the leaves and pods, and thus reducing very materially the yield.

Bacterial Blight.

(*Pseudomonas Phaseoli*).—This disease is caused by a micro-organism and is one of the worst enemies to beans. Every grower should make himself acquainted with the appearance and life history of this disease in order that he may guard against it.

It attacks the leaves, stems, and pods. Upon the leaves it causes large yellow or brown watery spots. These usually start first at the edges of the leaf and increase in size until the whole leaf is destroyed and become dry, brown and withered, and often falls off. The young pods are sometimes attacked, turn yellow and shrivel up before they are half grown. Most frequently, however, the disease is noticed on the fully grown pods, on which it causes watery spots, which spread rapidly and produce large areas in which pinkish brown spots appear, which look very much like the pod spot, but are seldom so sunken. The watery appearance of the diseased pods should enable any grower to recognize this disease.

This disease is carried over from year to year in the seed from a diseased crop, in the soil on which a diseased crop has been grown, or in straw from infected fields, in bedding or manure.

Prevention.—No remedy is known for the disease after the symptoms once appear in the plant. Measures, however, may be adopted to prevent its introduction and spread. Seed from a field in which there has been any of this disease should never be sown. It is impossible to remove all the infected seed even by the most careful hand picking, as some of it will show little or no indication of the disease. A field which has had a diseased crop of beans in it should not be planted again to beans for at least one season and a longer period of cropping with other crops would probably be of great help in freeing the field from a disease. If bean straw from infected fields is fed to stock or used as bedding, the manure should be returned to the field on which the beans grew, and not spread on fields which are free from the disease.

Clean seed on clean fields will produce a crop free from this Bacterial Blight. A good example of this is seen on the experimental plots of the Bean Growers' Association at Morpeth, where clean seed from Vermont has produced a crop practically free from the disease, while the crops from seed obtained from other places where the disease is prevalent are blighted.

Pod and Stem Rot of Beans (*Rhizoctonia*).

This is a trouble to which the writer's attention was called while at Morpeth. It is a disease practically new to Ontario and one which may be serious in wet seasons, such as the past. It causes the stems and pods to become soft, brown and

rotten, and the leaves to wither up. On the diseased parts, especially the pods, a thick, white, somewhat slimy fungus growth is produced and as the disease matures small black fruit bodies form in this growth. These carry the disease over the winter.

Growers should be on the lookout for this disease when the season is damp, in order to prevent it from spreading and causing serious loss.

Fig. 6.—Pod and stem rot of beans caused by a fungus, *Rhizoctonia.*

Outside Work.

Mr. Howitt has acted as Editor of "The Ontario Natural Science Bulletin" and as Secretary-Treasurer of the Entomological Society of Ontario. Short articles on weeds, weed seeds and fungus diseases have been published from time to time in the various farm papers by both Mr. Eastham and Mr. Howitt.

Herbarium.

A number of new specimens have been added. Some of these have been obtained from students' collections, but most of them were collected by Mr. Howitt while at Ames, Iowa, attending the Graduate School of Agriculture. Time has not permitted of these being listed as yet.

S. B. McCREADY.

PART V.

THE PROFESSOR OF PHYSICS.

To the President of the Ontario Agricultural College.

Sir,—I have the honor to submit herewith my fifth report as head of the department of Physics.

(*a*) *Lecture Courses.* In the first year the instruction in the department consists of courses in Arithmetic, Hydrostatics as a preparation for and followed by Soil Physics, and lastly, a course in the principles of Mechanics. The work of the second year consists of Surveying, Drainage and Farm Power and Farm Water Supply by electricity, wind and water. The third year makes a specialty of meteorology, Cold Storage, and Ventilation, based upon a thorough course in Heat. In the final year, Climatology, advanced drainage, and advanced Soil Physics are emphasized.

(*b*) *Laboratory Work.* Laboratory practice is given in all the years in the various subjects.

Weather Report.

Tables I. and II. give a summary of the weather data at representative stations which this department has equipped with the necessary meteorological instruments.

TABLE I.—Weather Report of 1910.

Month.	Mean temperature.	†Departure from normal.	Highest temperature.	Lowest temperature.	Snowfall in inches.	Rainfall in inches.	‡Precipitation in inches.	†Departure from normal.
O. A. C. Guelph—		[23 yrs.						[23 yrs.]
January	20.8	+ .7	41.0	— 7.0	21.02	.28	2.38	+ .40
February	17.3	—1.7	40.0	—14.0	14.42	.70	2.14	+ .53
March	37.1	+9.8	75.0	10.0	.25	.04	.07	—1.23
April	45.9	+4.5	77.0	25.0	.....	3.12	3.12	+1.40
May	51.5	+ .3	75.0	31.0	.....	2.75	2.75	+ .32
June	63.3	0.0	87.0	37.0	.....	.78	.78	—2.01
July	69.5	+1.4	93.0	49.0	.....	2.09	2.09	— .91
August	66.3	0.0	85.0	43.0	.....	3.19	3.19	+1.00
September	56.1	—3.6	78.0	34.0	.....	3.00	3.00	+ .79
October	49.6	+3.3	78.0	22.0	.....	2.68	2.68	+ .39
November	32.2	— .2	57.0	21.0	3.58	1.97	2.32	+ .07
December	17.8	—5.7	35.0	— 5.0	18.07	.....	1.80	+ .12
Year	44.0	+3.6	93.0	—14.0	57.34	20.60	26.32	+ .87

† These figures in brackets indicate number of years on which normals are based.
‡ Calculated by ten inches of snow being equivalent to one inch of rain.

TABLE I.—WEATHER REPORT OF 1910.—Continued.

Month.	Mean temperature.	†Departure from normal.	Highest temperature.	Lowest temperature.	Snowfall in inches.	Rainfall in inches.	‡Precipitation in inches.	†Departure from normal.
Bay View—		[4 yrs.]						[4 yrs.]
January	24.2	+5.0	47.0	10.0	11.7	3.22	4.39	+ .43
February	21.2	+3.8	41.0	16.0	20.7	1.54	3.61	−1.37
March	30.1	+3.8	42.0	29.0	5.6	1.08	1.64	— .61
April	42.5	+8.2	64.0	34.0	6.5	1.04	1.69	—1.35
May	49.5	+4.5	71.0	38.0	.....	2.38	2.38	— .21
June	56.0	— .2	76.0	52.0	.....	4.69	4.69	+2.41
July	61.8	— .9	84.5	48.0	.....	3.42	3.42	— .40
August	62.4	— .2	82.0	41.0	.....	1.70	1.70	—3.18
September	55.6	.....	74.0	37.0	.....	2.55	2.55	— .76
October	45.5	—1.4	67.0	29.0	.....	3.70	3.70	— .10
November	37.1	— .2	56.0	22.0	4.5	7.18	7.63	+3.51
December	23.3	—1.2	46.0	— .5	24.57	1.48	3.93	— .37
Year	42.4	.....	84.5	— .5	73.57	33.98	41.33	+ .75
Grimsby—		[1 yr.]						[1 yr.]
January	25.4	.....	45.0	0.0	.....	.....	.....	.....
February	24.7	.....	44.0	—10.0	.....	.....	.....	.....
March	40.0	.....	78.0	13.0	.....	.....	.....	.....
April	46.1	.....	74.0	25.0	.....	3.73	3.73	.....
May	52.3	.....	78.0	33.0	.....	2.80	2.80	.....
June	64.3	.....	92.0	38.0	.....	1.31	1.31	.....
July	71.9	.....	95.0	52.0	.....	3.84	3.84	.....
August	67.7	.....	89.0	48.0	.....	1.96	1.96	.....
September	59.0	.....	83.0	41.0	.....	5.32	5.32	.....
October	52.9	.....	78.0	26.0	.....	4.20	4.20	.....
November	36.1	.....	62.0	25.0	.....	1.72	1.72	.....
December	22.6	.....	41.0	— .5	1.83	.....	.18	.....
Year	46.9	.....	95.0	—10.0	1.83	24.88	25.06	.....
Jordan Harbour—		[3 years]						[3 years]
January	25.7	—1.1	45.0	4.0	5.00	1.34	1.84	— .37
February	19.6	—3.7	46.0	—2.0	2.00	.....	.20	— .80
March	36.5	+2.3	75.0	20.0	.....	.....	.....	—1.07
April	46.1	+3.1	73.0	28.0	.....	4.68	4.68	+2.02
May	51.1	— .8	77.0	36.0	.....	2.67	2.67	— .13
June	62.7	—1.6	92.0	38.0	.....	1.25	1.25	—1.10
July	69.1	— .6	95.0	50.0	.....	4.51	4.51	+ .90
August	67.1	— .7	87.0	50.0	.....	2.38	2.38	+ .34
September	64.8	+ .3	81.0	44.0	.....	2.30	2.30	— .43
October	42.0	— .3	62.0	27.0	.....	.49	.49	—1.89
November	36.3	—2.8	62.0	21.0	.....	1.36	1.36	— .43
December	23.6	—3.0	42.0	—2.0	.20	.52	.54	— .65
Year	45.4	.....	81.0	—2.0	7.20	21.50	22.22	—2.49

† These figures in brackets indicate number of years on which normals are based.
‡ Calculated by ten inches of snow being equivalent to one inch of rain.

TABLE I.—Weather Report of 1910.—Continued.

Month.	Mean temperature.	†Departure from normal.	Highest temperature.	Lowest temperature.	Snowfall in inches.	Rainfall in inches.	‡Precipitation in inches.	†Departure from normal.
Leamington—		[4 years]						[4 years]
January	21.4	— .6	39.0	2.0	10.5	1.56	2.61	— .26
February	21.6	—4.1	40.0	—1.0	3.25	.30	.62	— .94
March	41.0	+4.9	69.0	16.0	.....	.....	.....	.....
April	46.6	+4.1	71.0	25.0	.....	3.21	3.21	+ .78
May	52.3	+ .7	76.0	28.0	.....	2.98	2.98	+ .37
June	64.6	.....	92.0	33.0	.....	2.98	2.98	— .35
July	72.7	+ .6	95.0	53.0	.....	1.14	1.14	— .61
August	70.4	— .2	92.0	45.0	.....	1.76	1.76	—1.02
September	63.3	+1.4	83.0	41.0	.....	2.20	2.20	— .07
October	53.5	+3.5	80.0	24.0	.....	2.57	2.57	+ .55
November	32.9	— .5	57.0	20.0	.25	1.55	1.57	— .77
December	21.2	— .6	37.0	1.0	13.25	.....	1.32	— .17
Year	46.8	.....	95.0	—1.0	27.25	20.25	22.96	.....
Magnetewan—		[5 years]						[5 years]
January	14.9	+ .3	37.5	—25.0	30.7	.61	3.68	+ .35
February	8.4	—1.3	34.0	—32.0	16.7	.....	1.67	—1.18
March	29.7	+8.0	68.0	—10.5	6.6	1.10	1.76	— .79
April	44.3	+7.8	74.5	21.5	2.8	1.86	2.14	— .73
May	48.1	+ .7	73.5	23.5	.....	2.97	2.97	+ .23
June	58.7	+1.5	84.5	30.0	.....	2.02	2.02	— .42
July	64.9	+ .6	86.5	40.5	.....	2.84	2.84	+ .73
August	62.4	— .1	79.0	40.0	.....	5.53	5.53	+1.38
September	52.5	—3.5	75.5	26.0	.....	3.31	3.31	+ .11
October	47.8	+4.1	76.0	18.0	1.2	4.07	4.19	+ .80
November	27.9	—2.5	52.0	8.0	.....	.35	.35	—2.53
December	5.4	—8.9	34.0	—2.8	20.0	.....	2.00	— .85
Year	38.8	— .5	86.0	—32.0	78.0	24.66	32.46	—2.90
Maitland—		[5 years]						[5 years]
January	33.8	+12.7	47.0	—13.	7.5	9.8	1.73	—1.29
February	15.5	+ 2.7	47.0	—20.	18.5	.95	1.13	— .29
March	36.1	+13.9	68.0	2.0	8.0	.12	.92	— .81
April	45.5	+ 6.3	67.0	27.0	.....	1.22	1.22	— .79
May	52.1	+ 1.5	80.0	33.0	.....	3.40	3.40	+ .04
June	63.6	— .4	83.0	39.0	.....	.95	.95	—1.66
July	69.9	+ 1.8	88.0	50.0	.....	1.54	1.54	— .82
August	67.8	+ .4	86.0	49.0	.....	1.53	1.53	+ .05
September	58.9	— 2.2	79.0	35.0	.....	1.77	1.77	— .85
October	60.0	+11.1	74.0	34.0	.....	2.44	2.44	+ .20
November	34.6	— .1	59.0	20.0	.....	1.45	1.45	— .34
December	22.2	+ 3.3	34.0	—3.0	16.5	.....	1.65	— .49
Year	46.7	+ 2.4	88.0	—20.	50.5	25.17	30.22	—7.05

† These figures in brackets indicate number of years on which normals are based.
‡ Calculated by ten inches of snow being equivalent to one inch of rain.

TABLE 1.—WEATHER REPORT OF 1910.—Continued.

Month.	Mean temperature.	†Departure from normal.	Highest temperature.	Lowest temperature.	Snowfall in inches.	Rainfall in inches.	‡Precipitation in inches.	†Departure from normal.
Marksville—		[5 yrs.]						[5 yrs.
January	18.8	— .8	35.0	0.0	22.0	.....	2.20	+ .30
February	18.6	+1.5	34.0	1.0	18.0	.....	1.80	— .52
March	30.7	+4.1	63.0	1.0	.....	1.28	1.28	—1.21
April	42.2	+5.7	58.0	25.0	.....	5.43	5.43	+2.60
May	47.9	+ .4	74.0	24.0	.....	4.22	4.22	+ .59
June	62.4	+1.1	88.0	38.0	.....	1.15	1.15	—1.46
July	65.3	+ .3	90.0	43.0	.....	2.70	2.70	— .50
August	63.1	+ .1	84.0	40.0	.....	2.84	2.84	— .59
September	53.8	—4.4	74.0	38.0	.....	4.67	4.67	+ .69
October	46.4	+1.9	76.0	25.0	.....	3.26	3.26	+ .61
November	30.9	—3.2	55.0	5.0	3.5	1.16	1.51	— .95
December	13.3	—6.0	35.0	—19.0	38.0	.....	3.80	+1.33
Year	41.1	+ .3	90.0	—19.0	81.5	26.71	34.86	+ .88
Sturgeon Lake—		[3 yrs.]						[3 yrs.]
January	19.5	+1.1	38.0	.2	6.50	.....	.65	— .94
February	16.4	—1.3	38.0	0.0	1.00	.....	.10	—1.61
March	35.5	+6.7	67.5	2.0	.....	.....	0.0	— .60
April	46.1	+6.1	73.0	24.0	.90	3.30	3.39	— .42
May	50.7	—1.0	71.0	30.0	.....	2.60	2.60	— .08
June	62.8	—1.7	85.0	36.0	.....	4.10	4.10	+2.38
July	67.8	— .4	91.0	38.0	.....	3.48	3.48	+ .20
August	64.6	—1.0	82.0	43.0	.....	3.63	3.63	+ .75
September	55.3	—3.2	76.0	33.0	.....	3.68	3.68	+1.41
October	46.6	.....	75.0	20.0	.8	3.50	3.58	+1.64
November	30.6	+6.5	50.0	18.0	1.40	1.10	1.24	—.46
December	8.3	.....	35.0	—20.	.....	.....	.....	.....
Year	42.0	.....	91.0	—20.0	10.60	25.39	26.45	.....
Walkerton—		[3 yrs.]						[3 yrs.
January	21.3	.....	41.0	— 9.0	.....	.....	.....	.....
February	17.3	.....	40.0	—13.5	.....	.....	.....	.....
March	36.0	+4.6	75.0	5.0	.....	.75	.75	.....
April	46.3	.....	78.0	24.0	.....	3.03	3.03	.....
May	49.6	.....	73.0	28.0	.....	4.24	4.24	.....
June	62.2	—1.5	86.0	34.0	.....	2.61	2.61	+ .24
July	71.6	+2.4	91.0	45.0	.....	1.10	1.10	—1.15
August	63.7	—1.6	87.0	42.0	.....	4.84	4.84	+2.01
September	56.7	—2.9	80.0	33.0	.....	2.71	2.71	+ .32
October	49.3	+1.0	78.0	30.0	.61	2.00	2.06	— .19
November	23.1	—3.8	58.0	19.0	7.75	1.34	2.11	—1.02
December	17.8	—4.3	35.0	— 4.0	.....	.....	.....	.....
Year	43.7	.....	91.0	—13.5	8.36	22.62	23.44	.....

† These figures in brackets indicate number of years on which normals are based.
‡ Calculated by ten inches of snow being equivalent to one inch of rain.

TABLE I.—Weather Report of 1910.—Concluded.

Month.	Mean temperature.	†Departure from normal.	Highest temperature.	Lowest temperature.	Snowfall in inches.	Rainfall in inches.	‡Precipitation in inches.	†Departure from normal.
Monteith—								
July	60.0	.....	93.0	35.0	.....	5.52	5.52	.....
August	58.4	.....	80.0	31.0	.....	3.50	3.50	.....
September	4.76	.....	75.0	20.0	.....	3.43	3.42	.....
October	42.3	.....	71.0	20.0	.50	6.25	6.30	.....
November	26.0	.....	50.0	6.0	25.0	.....	2.50	.....
December	6.6	.....	33.0	26.0	34.0	.....	3.40	.....
St. Catharines—		[4 years]						[4 years]
January	25.3	—1.4	44.0	3.5	17.25	1.90	3.63	+ .95
February	18.1	—2.8	44.0	—20.0	36.5	.68	4.33	+1.25
March	38.9	+5.9	75.0	15.0	3.5	.68	1.03	—1.29
April	45.7	+3.5	80.0	25.0	.....	5.42	5.42	+2.38
May	52.9	+2.4	77.0	34.0	.....	2.11	2.11	—1.12
June	63.0	—1.3	89.0	36.0	.....	1.36	1.36	.....
July	71.4	+1.1	92.0	30.0	.....	4.23	4.23	.....
August	67.7	0.0	86.0	50.0	.....	3.10	3.10	+ .95
September	62.8	— .5	82.0	35.0	.....	2.66	2.66	+ .08
October	53.1	+3.0	79.0	31.0	.....	4.31	4.31	+1.81
November	40.5	.....	62.0	26.0	Not reported.		.....	.....
December	22.8	—4.9	40.0	6.0	"	"	.....	.....

† These figures in brackets indicate number of years on which normals are based.
‡ Calculated by ten inches of snow being equivalent to one inch of rain.

TABLE II.—Length of Seasons at Various Stations, 1910.

Stations.	Last killing frost in spring.		First killing frost in autum.		No. of days between first and last frosts.	Average length of season free from killing frosts.
	Date.	Degree.	Date.	Degree.		
Guelph	April 2...	28	Oct. 29....	22	210 days.	149 (23 yrs.)
Bay View	March 31 .	29	Oct. 4.....	29	156 "	151 (4 yrs.)
Grimsby	April 13..	25	Oct. 29....	29	168 "	168 (1 yr.)
Jordan Harbour	April 13..	28	Oct. 28 ...	30.5	167 "	163 (3 yrs.)
Leamington	May 14...	30	Oct. 28 ...	28	136 "	150 (3 yrs.)
Magnetewan	April 4...	30	Sept. 14 ..	30.5	162 "	129 (5 yrs.)
Maitland	April 28..	29	Nov. 1....	28	126 "	144 (5 yrs.)
Marksville	May 30...	29	Oct. 7.....	30	130 "	132 (5 yrs.)
Monteith	.....	.....	Sept. 1 ...	30	.....	.....
St. Catharines	April 14..	30	Nov. 4 ...	29	204 "	176 (4 yrs.)
Sturgeon Lake	May 15...	30	Oct. 13....	28	151 "	150 (2 yrs.)
Walkerton	May 15...	28	Oct. 1.....	30	137 "	145 (3 yrs.)

TABLE III.—Wind Record at Guelph.

Month.	Miles of wind during month.	Number of days during which records were taken.	Average per day.	Average per hour.	Windiest day—miles.	(1) Per hour.	(2) Windiest hour—miles.	(3) Least windy hour.	Calmest day—miles.	(1) Per hour.	(2) Windiest hour.	(3) Calmest hour.
January	9,656	31.00	311.5	13.0	669	27.9	42	16	97	4.0	10	0
February	8,173	27.03	302.4	12.6	551	22.9	37	6	111	4.6	8	0
March	8,944	31.0	288.5	12.0	601	25.0	36	16	42	1.7	10	0
April	7,543	27.39	275.4	11.5	506	21.1	27	9	45	1.9	7	0
May	7,606	31.0	245.1	10.2	551	22.9	35	10	100	4.1	8	0
June	5,293	29.12	181.7	7.6	363	15.1	26	7	25	1.1	6	0
July	5,880	30.13	195.2	8.1	366	15.2	26	8	40	1.6	6	0
August	5,929	30.41	194.9	8.1	515	21.4	31	13	53	2.2	5	0
September	5,802	30.00	187.2	8.0	378	15.7	20	10	71	2.9	10	0
October	7,787	30.25	257.4	10.7	553	23.0	32	14	78	3.2	8	0
November	8,279	29.1	284.7	11.9	431	17.9	22	9	120	5.0	13	1
December	8,415	30.2	278.6	11.6	535	22.3	33	15	108	4.5	8	1
The Year	89,307	357.63	249.7	10.4	669	27.9	42	16	25	1.1	6	0

TABLE IV.—Buildings Struck by Lightning in 1910.

How reported.	Barns.				Houses.				Others.			
	Burned.	Damaged.	Total.	Loss.	Burned.	Damaged.	Total.	Loss.	Burned.	Damaged.	Total.	Loss.
				$ c.				$ c.				$ c.
Personally	12	4	16	33,045.00	1	1	2	1,569.50	2	....	2	1,810.75
Newspaper	14	1	15	*28,663.00	....	2	2	*139.00	....	4	4	.....

*Loss at same rate as those personally reported.

TABLE V.—Other Information Regarding Barns.

Barns personally reported.

Windmill		Distance from Railway.		Location.	
Mill on or near	2	3 miles	1	On plain	13
No mill	9	4 "	1	On hill	2
Not specified	5	Not specified	14	Not specified	1

TABLE VI —Animals Struck by Lightning.

Animals.	In field.	By fence.	In or near building.	Location not reported.	Totals 1910.	Totals 1901-1910.
Cattle	Not	specified.	.....	5	5	367
Sheep	"	"	.....	1	1	138
Horses	.....	.....	.....	2	2	95
Pigs	.....	.....	.....	.....	.....	30

TABLE VII.—SUMMARY OF BUILDINGS STRUCK FROM 1901-1910.

Year.	Personally reported.		Reported from all sources.		Totals.	Extent of loss.		Rodded Buildings.	
	Barns.	Others.	Barns.	Others.		Burned,	Damaged.	Burned.	Damaged.
1901...	26	6	26	6	32	15	17	3	1
1902...	34	14	39	19	58	11	47	.....	3
1903...	18	5	24	8	32	16	16	.....	2
1904...	20	5	62	19	81	54	27	.....	.....
1905...	23	11	28	14	42	26	16	.....	.....
1906...	47	18	77	41	118	59 barns 2 houses	18 barns 39 houses	1	1
1907...	31	10	61	32	93	53	40	1	.....
1908...	15	9	34	21	55	32	23	.....	3
1909...	17	11	32	19	51	20	31	.....	3
1910...	16	4	15	22	37	29	8	1	2
Totals.	247	93	398	201	599	317	282	6	15
	340		599			599		21	

TABLE VIII.—ANIMALS STRUCK.

Animal.	1910	1909	1908	1907	1906	1905	1904	1903	1902	1901
Cattle	6	58	29	29	79	19	32	8	22	33
Sheep	1	.....	1	6	67	.....	9	1	47	7
Horses	2	11	2	10	15	8	8	2	17	11
Pigs	.....	4	1	9	8	.....	.....	.....	3	1
Totals	9	73	33	54	169	27	49	11	89	52

TABLE IX.—SUMMARY OF TREES STRUCK FROM 1901-1910.

Year.	Elm.	Pine.	Oak.	Maple.	Apple.	Basswood.	Poplar.	Willow.	Ash.	Hemlock.	Balsam.	Cedar.	Spruce.	Cherry.	Chestnut.	Hickory.	Birch.	Beech.	Butternut.	Fir.	Walnut.	Pear.	Thorn.	Total.
1901-1909	42	25	16	13	8	9	6	6	5	5	5	4	4	3	2	2	2	1	1	1	1	1	1	161
1910	3	1	1	..	..	2	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	9
1901-1910	45	26	17	13	8	11	6	6	5	6	5	4	4	3	2	2	3	1	1	1	1	1	1	170

DRAINAGE SURVEYING.

During 1910 the Drainage Campaign of this department has assumed much larger proportions than heretofore. This results from the liberality of the Ontario Government in appropriating $4,000 for the work instead of the $1,000 previously devoted to it. Any farmer wishing assistance in laying out his drains may make application for one of our drainage advisers. As soon as this application is reached we send a man to make a survey; and after the survey a drainage demonstration

is held right in the field where the survey was made. At this meeting we demonstrate methods of determining the grade of a ditch and digging to grade; and drainage in all its aspects is fully discussed. This offer of assistance was first made in September, 1905, and its popularity may be judged from Table X.

TABLE X.—Summary of Survey Work of the Department of Physics.

Year.	Applications.	Surveys.	Applications held over.	Acres surveyed.	Miles of drains.	Demonstrations.	
						Number.	Attend'nce (average)
1906	15	15	.....	500	45	.....	.....
1907	126	70	56	3,500	350	.....	.....
1908	166	100	66	5,000	510	43	.....
1909	302	179	121	5,157	613	48	18
1910	518	383	135	14,672	1,800	132	23.6

It will be observed that the increase has been very rapid, and that despite the extra money appropriated we are this year holding over more applications than ever before. It is also noticeable that in 1910 we have made more surveys and covered a larger area than in all the preceding years combined.

The work has been well distributed—we had applications from 37 counties in 1910.

Attendance at Demonstrations.

The attendance at the demonstrations has been a matter of considerable gratification to the department. Every applicant furnishes a list of 20 neighbors who might be interested in drainage. These are the parties we "go after" for our demonstration. The average attendance has exceeded this number, being practically 24, so that our system of advertising may be regarded as fairly efficient. We "go after" our prospective audience in six different ways.

(1) A post-card, addressed to each individual mentioned on the application, telling him that a drainage demonstration will be held at his neighbor's, that he will receive another card giving dates, and that Bulletin 174 on the Benefits of Drainage is being sent him which will explain the object of the meeting. This "first card" is sent as soon as the application is filed.

(2) Bulletin 174 is sent each man, as per "first card."

(3) A "second" post-card is sent to each individual two weeks before the demonstration, giving the day and hour of meeting, and telling him that Bulletin 175 on "Drainage Operations" is being sent.

(4) Bulletin 175 is sent as per "second card," so as to arrive just a few days previous to the demonstration. The "second card" asks recipients to bring No. 175 to the meeting with them as the methods described therein will be demonstrated and discussed; and as a matter of fact many of them do bring it; and if by any chance some of the copies have not arrived, as sometimes occurs, the parties concerned enquire rather complainingly as to the cause of non-arrival.

(5) One dozen bills of good size, 12 inches x 21 inches, are sent to the applicant, to be posted up in the neighborhood, announcing the demonstration, with date and hour.

(6) Newspaper notices of the demonstration. These are sent to all the local papers in the vicinity.

When two or more surveys are within two miles of each other we combine and hold one demonstration at the survey most centrally located. In such cases we "go after" 40 or 60 instead of 20. It is these combined demonstrations that run the average attendance above the 20 names per application.

The Effect of the Drainage Campaign.

The effect of this campaign has been remarkable—the number of tile made in Ontario in 1905 was 15,000,000, this year it is 35,000,000. Table XI shows the tile output for the various years from 1900 to 1910 inclusive.

TABLE XI.—Drain Tile Manufactured in Ontario, 1900-1910.

	Number.	Value.
1900	19,544,000	$209,738
1901	21,592,000	231,374
1902	17,510,000	199,000
1903	18,200,000	227,000
1904	16,000,000	210,000
1905	15,000,600	220,000
1906	17,700,000	252,500
1907	15,578,000	250,122
1908	24,800,000	338,658
1909	27,418,000	363,550
1910	35,150,000	

1,000,000 tile drain approximately 2,000 acres.

All but 1910 figures are from the reports of the Bureau of Mines, Toronto. The tile-makers, or at least half of them, have recently at our request sent to the department of Physics a statement of their 1909 and 1910 outputs, from which we learn that the increase from last year is 28.2 per cent.

Adding this percentage to the Bureau of Mines figures for 1909 we arrive at an estimate of 35,150,000 for 1910. Last year we made a similar estimate in advance which turned out to be very close to the actual figures later given by the Bureau.

A little study of the table will show considerable decrease in tile made during the five or six years preceding the inauguration of the drainage campaign. So that a long-continued decrease has been stemmed and supplanted by an increase which has more than doubled the output in five years—increased it 133 1-3 per cent., to be specific. It would be folly to claim that this is all *directly* due to the work of the College—rainy seasons, the Farmers' Institutes, the Agricultural Press have all had their influence. These forces have been in operation for many years. Of course the decrease in drainage from 1900 to 1905 cannot be charged to their teaching. In 1905 the College announced. and in 1906 commenced, its campaign, but it was not until 1908 that the phenomenal increase began. That was the first year the Government set aside a special drainage appropriation, the amount being $1,000. The increase in drainage that year over the previous year was 62.8 per cent. The appropriation remained at $1,000 for 1909, the increase in tile being 10.5 per cent. In 1910 the appropriation was raised to $4,000 and the increase in drainage rose to 28.2 per cent., illustrating the direct relation between the money expended and the benefits received. But while the revival of interest in drainage traces its *origin* to the College, the Farmers' Institutes and the Agricultural Press, especially the latter, have from the first lent powerful and indispensable aid in bringing the results of our work and the benefits of drainage in general before the people in all parts of the Province. There is still another force that has

exerted a strong influence on drainage in some counties—I refer to the District Representatives of the Department of Agriculture. Through the various local organizations such as Farmers' Clubs and Institutes, these men have driven home the lesson of drainage very effectively.

Influence of Rainfall on Drainage.

There is an impression in some quarters that the rainfall during springtime has had a great deal to do with the increase in drainage. In a study of this point I made charts side by side of the rainfall and the tile made in the different years from 1900 to 1910. These are shown in figure 1.

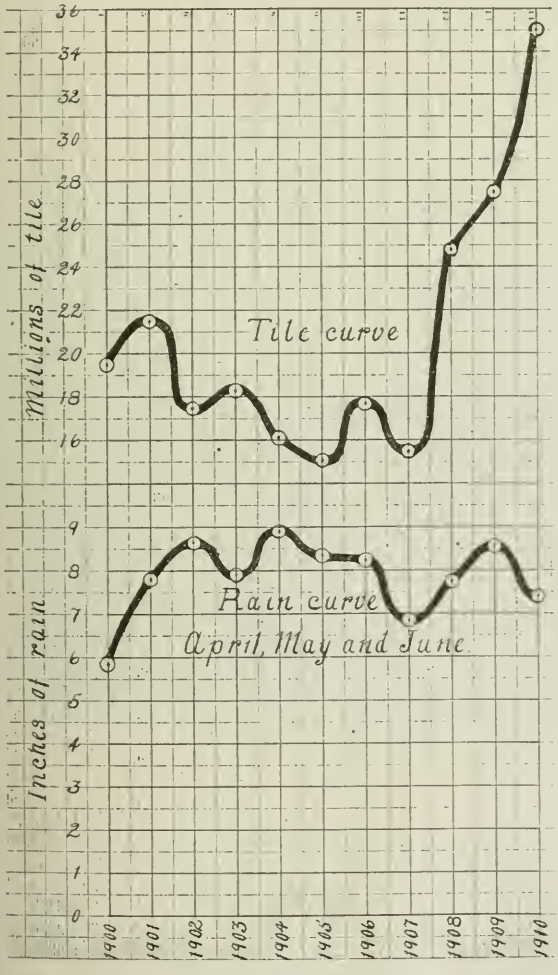

Fig. 1.—Curves showing fluctuations of rainfall (average of all stations in Ontario) for April, May and June, 1900-1910. And fluctuations in number of tile manufactured in Ontario, 1900-1910.

It will be observed that the rainfall for April, May and June, although showing some fluctuations, *increased* in a general way from 5.8 inches in 1900 to 8.9 inches in 1904. During the same period the tile output, which also showed some fluctuations, *decreased* in a general way from 19½ millions in 1900 to 16 millions in 1904, and 15 millions in 1905. Since 1904 the rainfall has decreased, but the tile increased. There are five years in which the curves agree and five in which they are diametrically opposed: and in their general trend they disagree, so we must conclude that the influence of rainfall on tile output is of minor importance compared with other forces operating. Two things occurred in 1905: minimum tile output, and announcement of the drainage campaign. The divergence of the curves since 1905, coupled with the very rapid unprecedented rise in the tile curve, shows that some force stronger than those pre-existent became operative that year. Perhaps no one will object to the claim that the drainage propaganda of the Ontario Agricultural College, supported by other agencies already mentioned, constitutes that new force.

Value of the Increased Drainage.

Allowing that one million tile drain two thousand acres, which is about the average throughout the country, then to-day 91,392 acres of land are drained which would not have been drained if the tile output had remained as in 1905, to say nothing of the decrease that had been going on for some years. If this 91,392 acres are producing $20 per acre per year more than in the undrained state, as would appear from reports in Bulletin 174, then the value of this increased drainage to date is $1,867,840 per year. This is a princely return from the $6,000 spent in the work thus far.

From these results we may well ask ourselves whether this work should not be greatly expanded.

Influence of Underdrainage on Spring Floods.

During recent years my attention has been drawn to the opinion held by some that underdrainage increases floods. After much thought and some investigation, I have come to hold the opposite view.

Fig. 2.—Point Pelee Marsh. Canal and Dyke on south side, looking east. Dyke turns south 100 feet in rear of buggy.

In the first place, facts, so far as I have been able to observe and otherwise learn, show that underdrainage lessens the amount of water at times of freshet. Let me illustrate: On a certain farm of which I could give the lot, concession, and township, there was a swamp of 15 acres, the water from which flowed along a lane ditch, a part of the fall being quite rapid. The swamp was all cleared at one time, but the upper 5 acres had been allowed to grow up into a slash. The remaining ten acres was cropped, but with indifferent results, as it was too wet, a few open ditches and water furrows providing the only drainage. Every spring freshet brought down large volumes of water, the evidence of which might be seen in the washing of the banks and the cutting of the rock in the rapid portion of the

ditch, and also in the large deposits of mud lower down where the grade was not so steep. Some years ago the ten acres was tile drained, and personally observing the ditch from time to time since then, I have wondered at the comparative freedom from washing, cutting, and sediment. The five acres was afterwards cleared and tiled and the erosion and deposit of sediment still further reduced. Only a week or so ago the owner corroborated my own observations, and stated very emphatically that in his case tile drainage, and that alone, had decreased the floods.

There is the fact, as revealed by observation and testimony, in one case at least. Let us examine whether it is what should be expected as a result of underdrainage. Speaking for Ontario generally, there is more precipitation in June, July, and August than in any other months, as may be learned from the records kept at the observatory in Toronto, nevertheless the ground is drier in August and early September than at any other time. In late September, October, and November, however, the ground becomes wetter and wetter, not because of increasing rainfall, for it is really less then than in the summer, but because evaporation is

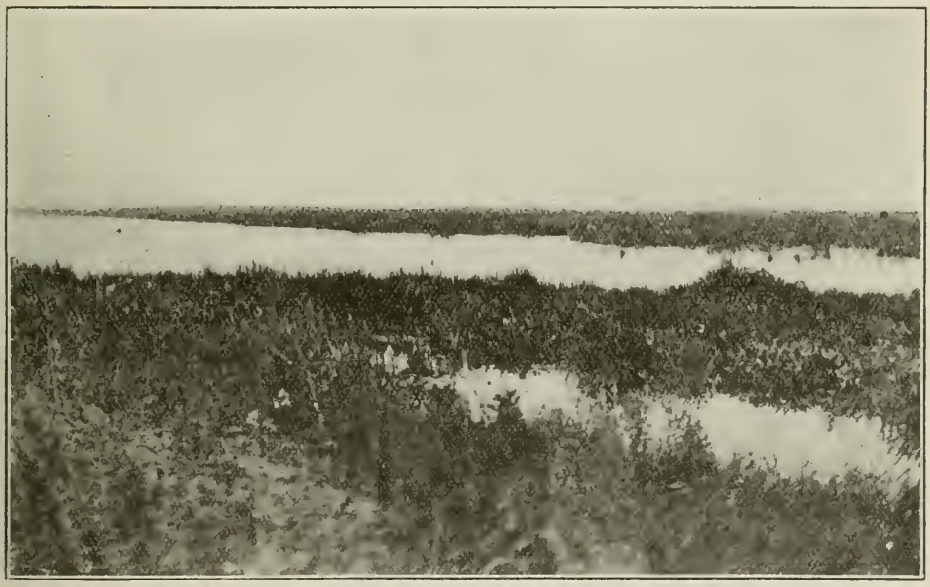

Fig. 3.—Point Pelee Marsh. Looking outside the dyke, from rig shown in Fig. 2, showing original state of reclaimed marsh.

less, and any rain that does fall remains to moisten the ground instead of being returned to the air in vapour. The soil, however, is porous like a sponge, and in its dry state it is capable of absorbing a great deal of water before becoming really wet, and before any is lost either by run off or drainage. Often the rainfall for November is very large, for instance, in 1908, at Guelph, it was 5.07 inches for one month, and in 1909, 6.41 inches, which is more than for April and May combined, except once in the twenty-three years' records at the College, yet the November rains do not cause floods, not even the phenomenal rain of November, 1909. Why? Because the soil is far from saturation, and consequently is able to absorb most of the rain that comes. Moreover, the November rains are usually of the moderate, steady nature, giving plenty of time for absorption of the water by the soil. By the middle of December, when in most parts of Ontario it is permanently frozen up for the winter, the ground is usually pretty thoroughly saturated, and

from the highlands considerable drainage, either natural or artificial, has occurred, with the result that much undrained, low land, such as slashes, swamps and marshes, is under water. On December 4th, 1909, I attempted to cross a swamp that I had crossed a month before without difficulty, but found the water so deep that I could not have done so had it not been frozen over. Practically all the undrained, slashes, swamps and marshes have their soil saturated, indeed, covered with water, by the middle of December, and in that condition they remain until spring, when in March or April the snow melts and several inches of water all over the country is liberated within a few days, sometimes, indeed, within a few hours. The soil on the upland being still frozen, or practically saturated with water, if the frost is out, the melted snow, unable to find entrance to the soil, takes the steepest slope for the low land, the slashes, swamps and marshes, where it finds a soil long since saturated and covered with water. These reservoirs, already nearly full, soon overflow and a flood results. These are conditions familiar to all who have given any

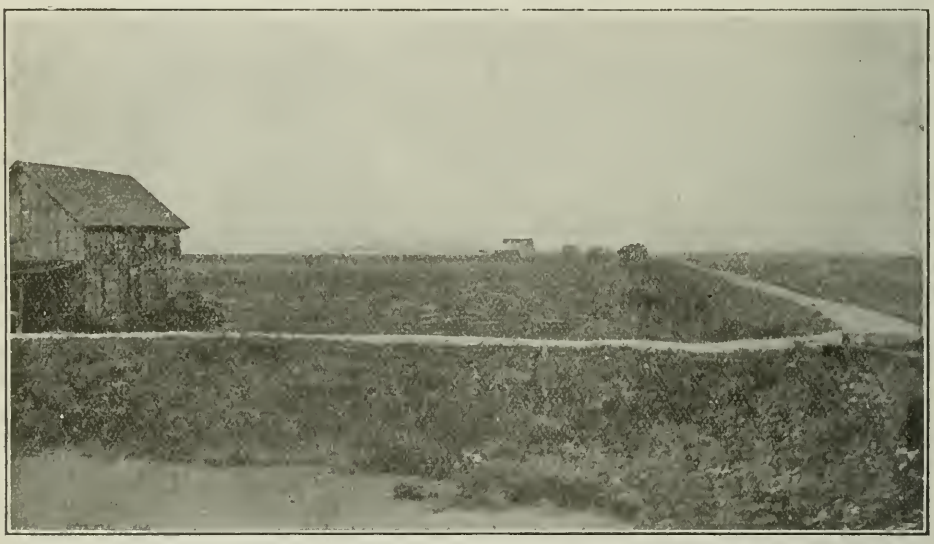

Fig. 4.—Point Pelee Marsh. Looking west, inside the dyke, where dyke turns south.

thought or observation to the subject. What should we find if the slashes, swamps, and marshes were tile drained? During the latter part of December last the drains in the one-time swamp previously mentioned were pouring a nice stream of water down the lane ditch, as they do every winter, and when the spring time comes around that 15 acres is thoroughly drained. Therefore when the snow-water from the high land reaches the swamp (?) instead of finding a saturated soil covered with water, it finds a soil comparatively dry and capable of absorbing great quantities of water. When this absorption has taken place, and when the soil has become covered with water to the same depth as it used to be during the winter before the drains were put in, there is not nearly so much surplus left to cause floods as if the snow-water had found the swamp already nearly full as it used to. Consequently, underdrainage should be expected to lessen floods, not increase them. That experience bears out the logic is strong evidence of its correctness.

To be sure, the drains begin working in the spring as soon as the water has saturated the soil, but underdrainage is slow compared with run-off, and the

amount of water the drains deliver in a given time is small compared with the overflow that must occur in the same time if the water running into the swamps found them already full almost to overflowing.

If the prevention of floods is an end to be desired, as all believe it is, then I make bold to say that for its attainment underdrainage of those slashes, swamps, and marshes that in winter are saturated, nay overflowing in many cases and flooded in others, together with the drainage of cleared lands that are too wet, is the most powerful, feasible agency available to the people of older Ontario, a statement that I am satisfied the experience of the future will verify. Reforestation of the arable uplands might possibly have a greater effect, but it is not feasible—they are needed for agriculture. Reforestation of the waste lands of the Province will contribute materially towards reduction of the floods, but its effect can never approach in magnitude that of underdrainage. for the area admitting of such treatment is small compared with that needing drainage.

Fig. 5.—Point Pelee Marsh. Potatoes (on right) and beans (on left), growing on reclaimed land.

Marsh Drainage.

There is another phase of drainage to which I have given considerable attention during the year, viz., the drainage of marshes. These are lands which lie adjacent to some body of water—lake or river—and which are below its level for part, and in some cases all, of the summer. There is just one way to drain them, viz., build a dyke on the waterward side and pump the water from the marsh over the dyke into the lake or river. In Europe, Holland particularly, this method of drainage has been in vogue many, many years, and by it Holland has reclaimed much valuable land from the sea itself. About 30 years ago the first "pumping system" in Ontario was installed in the township of Raleigh, known as the "Pike Drainage Works." Since then others have been established, until now there are six in the counties of Essex and Kent.

In September I visited and inspected two of them, viz., Pelee Island and Point Pelee. On "the Island" some 8,000 acres that formerly lay below the level of

Lake Erie the year round has been reclaimed; on "the Point" some 4,000 acres. Mr. Alexander Baird, C.E., of Leamington, who has had to do with nearly all the "pumping systems," either in the original planning or subsequent improving thereof, took much pains in showing me over the systems visited. Photographs were taken on both occasions, but the visit to Point Pelee was made on a dull, showery day and some of the pictures were taken while it was actually raining lightly. Figures 2 to 13 show some of the salient features observed during the visits mentioned.

The first thing that strikes one is the immensity of the dykes. Next one notes the transformation produced by the drainage.

Two types of pump are in use, the "dash wheel," which may be seen (Fig. 11) and the "centrifugal," the latter being the more satisfactory. It is built on the same principle as the "blower" of a threshing machine. One of these units dis-

Fig. 6.—Pelee Island Marsh. Tobacco on the farm of Mr. Colin Quick, Scudder. Crop worth about $300 per acre. Note various homesteads in background. This land lay about 2 feet under water before drainage.

charges 20,000 gallons per minute. The original cost of draining the land runs from $7 to $10 per acre, and the pumping and maintenance from 25 to 50 cents per acre per year.

What I saw on this trip leads me to believe that it is time Ontario began in earnest to consider the reclamation of its marsh lands.

Tile-makers in Ontario.

We have many inquiries for the tile-makers in various sections of the Province. At considerable trouble we are making a list which will contain the names of the makers in all counties so far as we can learn them. This will be published shortly in bulletin form.

Freight Rates on Tile.

Many find that they are unable to get tile locally and therefore have them shipped in from distant yards. Numerous inquiries as to freight have led us to compile

a table showing approximately the freight per 1,000 tile of all sizes up to 12 inches, for all distances up to 175 miles. From the railways we learned their freight rates per hundred weight of tile in car lots for various distances. They range from 3 to 8 cents, as will be seen below. By actual weighing we found the weight of various sizes of tile to be about as follows:

Size of tile.	Weight of one tile.	Weight of 1,000 tile.	Size of tile.	Weight of one tile.	Weight of 1,000 tile.
	lbs.	lbs.		lbs.	lbs.
3 inches.....	5¼	5,250	7 inches.....	18	18,000
4 "	8	8,000	8 "	22	22,000
5 "	10½	10,500	10 "	27½	27,500
6 "	14	14,000	12 "	33	33,000

Knowing the freight rate for any distance, and the weight of 1,000 tile, the freight per thousand is easily worked out.

Approximate Freight on Tile of Various Sizes for Various Distances.

Distance in miles.	Rate per cwt.	Rate per 1,000 Tile.						
		3 in.	4 in.	5 in.	6 in.	8 in.	10 in.	12 in.
0–10	3c.	1.58	2.40	3.16	4.21	6.62	8.27	11.61
10–20	3½c.	1.84	2.80	3.68	4.90	7.71	9.63	12.97
20–30	4c.	2.10	3.23	4.20	5.60	8.80	11.00	14.80
30–40	4½c.	2.30	3.50	4.60	6.13	9.63	12.05	16.21
40–50	4⅝c.	2.49	3.80	4.98	6.65	10.45	13.04	17.55
50–60	5c.	2.69	4.10	5.38	7.17	11.27	14.10	18.95
60–70	5½c.	2.88	4.39	5.76	7.70	12.10	15.08	20.35
70–80	6c.	3.14	4.78	6.28	8.37	13.15	16.44	22.12
80–100	6½c.	3.41	5.19	6.82	9.10	14.30	17.86	24.05
100–125	7c.	3.60	5.48	7.20	9.60	15.08	18.85	24.89
125–150	7½c.	3.80	5.79	7.60	10.13	15.92	19.90	26.59
150–175	8c.	4.20	6.40	8,40	11.20	17.60	22.00	29.60

Cement Tile Experiments, 1903-1909.

Since the department began college extension work on the subject of farm drainage there have been numerous enquiries for information on the subject of concrete tile. People usually want to know two things, first, whether or not the concrete tile can be made more cheaply than the clay tile, and secondly, whether or not they will be durable. When these inquiries first began to come in there were not, so far as I am aware, any extensive or conclusive data as to the durability of concrete drain tile, nor was there any grave question about their durability. There was a general impression, however, that they should prove durable, judging from the manifold conditions in which concrete has proven its usefulness. Therefore, at first we concerned ourselves with the cost of manufacturing concrete tile by hand, for the point made by most of the inquirers was that they were thinking of procuring molds and making their own tile.

For use in our first experiments on the cost of manufacture, the London Concrete Machinery Co. furnished us with one of its two-piece concrete tile machines, since taken off the market. The experimentation was undertaken by A. M. Shaw.

Niagara Falls, Ont., who for several years assisted his father with the cement work for much of the road contracting in his locality. During the months of April and May, 1908, experiments were conducted in making cement tile.

While writing the report of those experiments in the latter part of the year, we learned of the controversy over the question of the durability of concrete drain tile, and we must confess that the idea of cement being soluble was a new one to us. After reading the attack on cement and the answer to it, we counselled our farmers to go slowly in the adoption of concrete tile, believing that the uncertainty in our own minds at least, about their durability, was sufficient to warrant such action. At the same time, however, we decided to conduct some tests in order to learn for ourselves something about the solubility of cement, and to deduce from the information thus obtained some idea of the probable durability of concrete tile. These experiments were begun in February, 1909, and have been continued until the present.

Besides the points already mentioned, the porosity of concrete tile received some attention during our experiments.

Fig. 7.—Point Pelee Marsh. Broom Corn.

Cost of Making Tile by Hand.

Tile made by the London two-piece machine were hexagonal on the outside, being ¾″ thick at the thinnest part and considerably thicker at the corners. Mr. Shaw found that, mixing his own material, he could make a shade over 500 complete 3″ tile in a day, when everything was once ready. The material had to be mixed quite dry in order that the moulds might clean, so dry indeed that it was impossible to tamp it close enough to make a compact tile. By oiling the moulds it was found that the material might be mixed much wetter, but still not wet enough to make what we consider a good tile. We also thought that considerably more material was used in these tile than would be necessary for a round tile, and besides, the amount of handling required for two-piece tile was double that for one-piece. These features led us to doubt that this type of machine would ever be popular with the farmers. On consultation with the company we found that they had arrived at the same conclusions, and were withdrawing the machine from the

market. These circumstances at first led us to think that the work done on this phase of the problem was of little practical value, and we discouraged the extensive publication of the results, although we placed them in our annual report just as a matter of record. On second thought, however, we have changed our minds somewhat, for the following reasons: The rate of manufacture determined must represent fairly well what might be expected with a round tile machine of similar dimensions. The round tile would be slower to tamp, but there would be only half as many pieces to handle. And as a matter of fact, we have since learned of a hand machine for round tile, recently invented, on which, it is said, one man can make about 500 tile a day, thus establishing that the rate of manufacture determined in our experiments is in all probability a fairly representative one.

Quantities Required in Manufacture.

We found further that 6 cubic feet of sand and 1 bag of cement (approximately a cubic foot) would make 78 complete 3" tile. But round tile ½" thick require only 55% as much material as the one made on the London two-piece machine, hence the material mentioned above would make 100/55 x 78, or 142 tile, providing they were tamped to the same compactness. As they could be made wetter, they would likely be somewhat more compact. This, however, would be counterbalanced by the use of another half bag of cement, making the proportions 4 of sand to 1 of cement. (6 to 1 is too poor for really strong tile), so that we may fairly assume from our figures that from 6 cubic feet of sand and 1½ bags of cement there can be made 142 3" tile, say 140 in round number.

This gives us a means of arriving at an estimate of the cost of making 3" tile, ½" thick, by hand, when the price of material is known. In Guelph we pay $1 a yard for sand and $1.90 for cement. At these prices,

6 cubic feet of sand cost	$ .22
1½ bags of cement cost	.71
Total price of material for 140 tile	$ .93
Total price of material for 500 tile	3.32
Wages of man for one day	2.00
Total cost of 500 tile	$ 5.32
Total cost of 1,000 tile	10.64

In this estimate no allowance is made for hauling the material, as this can be offset against the hauling of clay tile, if it is desired to make a comparison between the cost of the two kinds.

Prices used in estimate may be high for some localities, but knowing that 6 feet of sand and 1½ bags of cement will make 140 tile, and that if a man can make 500 tile a day on certain types of machine, the cost of manufacture may be figured out to suit the cost of materials in various localities. Or again, if type of machine is used that a man can make only 400 instead of 500 in a day the cost of the tile can readily be calculated. Farther on (page 70) we describe the 1910 experiments with another type of cement tile machine.

Solubility Tests.

Experiment 1.

Sample. A piece of concrete tile weighing 43.256 grams after being dried to constant weight at 215°F. This tile was made by the "dry process" in April, 1908, in proportions 6 of sand to 1 of cement. For a few days after being made

it was watered daily, and then it was submerged in water for a period of six weeks, after which it was removed and transferred to a storage cellar, where it remained until solubility experiments began. Tile quite porous.

TREATMENT. After the small piece had been dried to constant weight it was placed in distilled water for four days, then removed, dried, weighed, and again placed in fresh distilled water. This was repeated 16 times, the total period of solution being 143 days, and the total loss in that time was .113 grams. The total cement in the sample was 7.1794 grams, hence at this rate the cement would all dissolve in 27.7 years, under similar, constant conditions.

The experiment was next performed with water from the artesian wells at the college. This water is high in total solids, about 460 to 480 parts per million, made up chiefly of bicarbonate of calcium and magnesium. There is also a small amount of chlorine in it. The sample was tested five times in this water, the total period of solution being 47 days and the total loss in weight .090 grams. At this rate it would take only 10 years to dissolve all the cement in the sample.

Fig. 8.—Pelee Island Marsh. Stacks of grain grown on the marsh.

Experiment 2.

SAMPLE. A piece of tile, proportion 6 to 1, made on London two-piece machine. May, 1908, watered daily for a week after making, and stored in cellar till November, 1909; mixed much wetter than sample used in experiment 1, so wet indeed that the moulds would not clean well. Dry weight 43.213 grams.

TREATMENT. Same as sample in experiment 1, only the number of tests in distilled water numbered eight instead of 16, the total period in the water being 73 days. During the period the sample lost .025 grams, at which rate it would take 57.4 years to dissolve all the cement in it. When put in the well water the loss in 47 days was .090 grams, which rate would use up all the cement in 10.3 years.

Experiment 3.

SAMPLE. A piece of wet-mixed tile, made the same time as No. 2, and watered and stored in the same way. Dry weight 36.2795 grams.

TREATMENT. Distilled water for 73 days, well water for 47 days.

RESULT. This sample lost only slightly in distilled water, and gained .0333 grams in well water. At this rate it would last for ever.

Experiment 4.

SAMPLE. A piece of tile, proportions 4 of sand to 1 of cement, made by George Holden, St. Mary's, on the London Automatic Cement tile machine. Watered daily for a week after being made, and then stored in our laboratory until October, 1909. Dry weight, 20.4792 grams.

TREATMENT. Same as in 2 and 3.

RESULT. Loss in distilled water in 73 days = .0387 grams. At this rate the sample would last 5.1 years.

Fig. 9.—Pelee Island Marsh. North pump-house, from the rear (south). Showing the style of pump-house for centrifugal pump.

Experiment 5.

SAMPLE. A piece of tile, proportions 4 of sand to 1 of cement, made by same maker as No. 4, cured and stored in the same way. Dry weight, 35.781 grams.

TREATMENT. Same as others.

RESULT. In 73 days in distilled water the loss was .0175 grams, at which rate the sample would last 102.2 years. In 47 days in well water the sample gained .0165 grams in weight, and thus would never disintegrate.

Experiment 6.

SAMPLE. A piece of clay tile, about average quality, possibly burned a little slack. Dry weight 36.660 grams.

TREATMENT. In distilled water 48 days, weighed five times; in well water 47 days, weighed five times.

RESULT. Loss in distilled water, .159 grams, at which rate the sample would last only 4.1 years. Loss in well water, .081 grams, at which rate the sample would last 58.3 years.

In estimating the time that samples would last it has been assumed that they would be subject to solution 365 days in the year and that the rate of solution would be uniform. The first of these conditions certainly would not hold in practice. During a large portion of the year, probably half, tile are not subject to solution, and consequently would last twice as long as the periods mentioned, provided the rate of solution during the other half of the year was constant.

We had hoped to establish something definite as to the rate of solution, but we have failed to do so yet. The rate of solution seems to fluctuate with some factor other than time, probably temperature. Just when our curve for rate of solution would reach a constant for two or three readings, this variation would occur and prevent conclusions. In all samples the rate of solution in distilled water appeared to fall off, slowly in most cases, but very rapidly in a few, especially in the case of the clay tile. When placed in the well water the samples all behaved irregularly at first, giving either large losses or large gains and these losses or gains fell off rapidly.

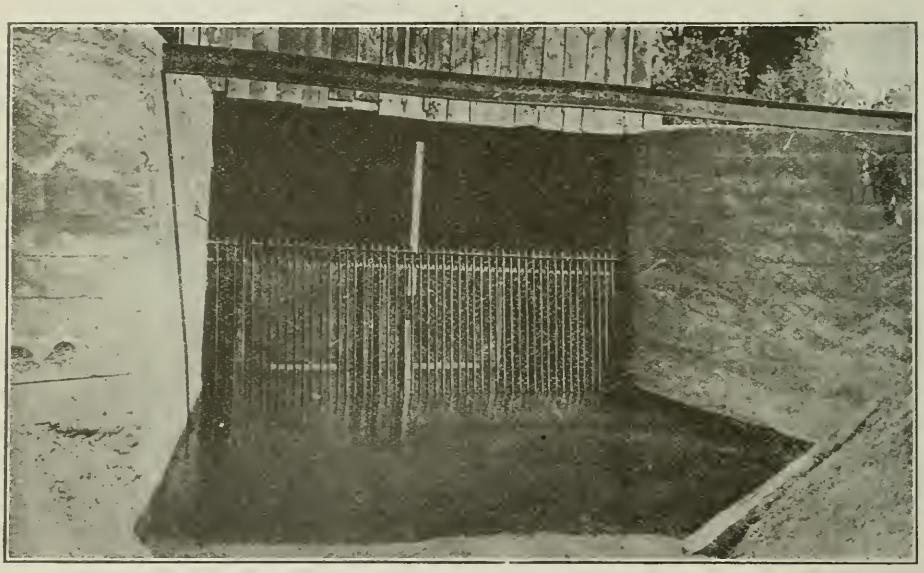

Fig. 10.—Pelee Island Marsh. Weir protecting pumps at north pump-house

Three other experiments were performed which probably come nearer natural conditions than the previous experiments. Three half tiles were placed in running well water on May 6th, 1909, where they have been ever since. At the end of six months they were dried, weighed and replaced in the water. In the latter part of March, 1910, they were dried and weighed again. The results are as follows:

Experiment 7.

SAMPLE. A half tile, proportions 6 to 1, made on London two-piece machine, dry process, May, 1908, watered for a week, stored in cellar. Dry weight, 1797.15 grams.

TREATMENT. In running well water for 10½ months, weighed at six months, and at 10½ months.

RESULT. Tile gained in weight each time. Total gain 3.4 grams.

Experiment 8.

SAMPLE. Same as in 7. Dry weight, 1910.25

TREATMENT. Same as 7

RESULT. No change in weight the first six months, a gain of 4.05 grams in next 4½ months.

Thus these samples would never disintegrate at this rate.

Experiment 9.

SAMPLE. A half tile, proportions 6 to 1, made on London two-piece machine, made very wet, so much so indeed that tile would not hold shape, and moulds would not clean. Allowed to dry, getting a few showers of rain, and then stored in cellar. Dry weight 2001.0 grams.

TREATMENT. Same as 7 and 8.

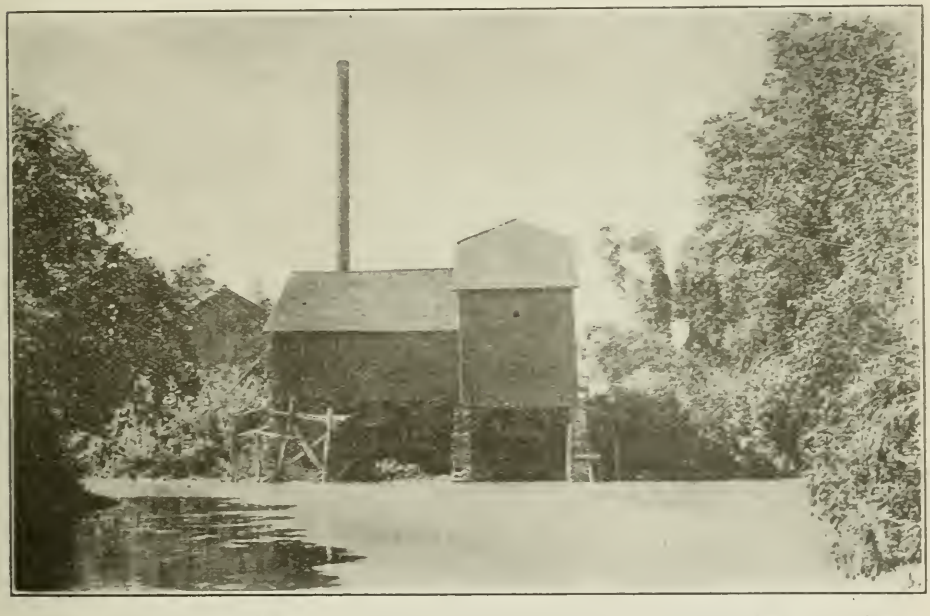

Fig. 11.—Pelee Island Marsh. West pump-house, from rear (east). Note paddles of dash-wheel. Showing style of pump-house for dash-wheel.

RESULT. Tile lost 1.91 grams first six months and 2.70 grams next 4½ months. At this rate the sample would last 63.4 years.

It is worthy of note with regard to these three samples, that those made by the dry process, and therefore very porous, were the ones to gain in weight, while that made by the wet process was the one to lose.

The behavior of these three large samples contrasts so strongly with that of the small samples as to indicate that experiments with small pieces are apt to be very far from actual conditions. For instance, the rate of solution for the piece of clay tile would indicate that that sample would all dissolve in less than two generations. And in much less than that the tile would be so weak as to give way under soil conditions. Experience has shown that these results do not occur, and hence we must conclude that the conditions are so artificial that it is not safe to

base arguments as to durability on such tests. It is even doubtful that the tests of large tile in running well water are very close to natural conditions. In the soil there will be very much fine sediment in the form of clay and colloid particles to lodge in the pores and prevent solution. The process of accretion shown in two out of three of these large samples would doubtless be much more rapid in the soil. Another reason for the slower solution in the large samples was the cooler temperature maintained by the constant introduction of cold water. Basing our conclusions on these larger samples, we are not able to see any danger of the concrete tile crumbling.

It is our intention to continue the work on the solubility, as we realize there is much still to be learned about it.

Porosity.

With regard to the porosity we find that it varies with the proportions of cement, with kind of sand used, and also with the method of making. The more

Fig. 12.—Pelee Island Marsh. Canal running north from west pump-house.

cement used, the finer the sand, or the wetter the mix the less porous the tile. But even the most compact ones tested were much more porous than clay tile.

1910 Cement Tile Experiments.

During the past autumn the Farmers' Cement Tile Machine Company furnished us with one of their machines equipped with all sizes from 3″ to 6″ to run either by hand or by power. We propose to determine at least three things: (1) The amount of material necessary for 1,000 tile of various sizes with different strengths of grout. (2) The rate at which tile of different sizes can be made by hand and by power. (3) The porosity of the tile and the pressure exerted by the packer. Thus far the work has been mostly on the amount of material for tile of different sizes.

Table showing the actual number of tile made from given quantities of material:

Size of tile.	Cubic feet of sand used.	Proportions of sand and cement.	Number of tile made.
3 inch	2	7 to 1	44
8 "	2	6 to 1	44
3 "	2	5 to 1	44
3 "	2	4 to 1	44
3 "	6	3 to 1	143
4 "	2	4 to 1	33
5 "	2	4 to 1	25
6 "	2	4 to 1	22

To those not familiar with cement it might seem strange that the same number of tile should be obtained for several different strengths of mixture—see 3-inch figures. Until a strength of 3 to 1 is reached, however, the cement appears to have no effect on the volume—it is lost, going into the pores of the sand. This gives us a clue to what we may expect to find when we reach the study of porosity and pressure.

From the data given above, we have calculated the number of tile from one yard of sand and from one bag of cement as follows:

Size of tile.	Strength of mixture.	Number of tile from 1 yd. of sand.	Cement for 1 yd. of sand.	No. of tile from 1 bag of cement.	Amount of sand for 1 bag of cement.
3 inch	7 to 1		3 6/7 bags	154	7 cubic feet
3 "	6 to 1		4 1/2 "	132	6 " "
3 "	5 to 1	594	5 4/5 "	110	5 " "
3 "	4 to 1		6 3/4 "	88	4 " "
3 "	3 to 1	643	9 "	72	3 " "
4 "	4 to 1	445	6 3/4 "	66	4 " "
5 "	4 to 1	337	6 3/4 "	50	4 " "
6 "	4 to 1	297	6 3/4 "	44	4 " "

Calculating still another way we have found the amount of materials necessary for 1.000 tile as follows:

Size of tile.	Strength of mixture	Cement required for 1.000 tile	Sand required for 1,000 tile.
3 inch	7 to 1	6.5 bags	46 cubic feet = 1.7 yards.
3 "	6 to 1	7.6 "	
3 "	5 to 1	9.1 "	
3 "	4 to 1	11.4 "	
3 "	3 to 1	14.0 "	42 cubic feet = 1.6 yards.
4 "	4 to 1	15.1 "	61 cubic feet = 2.2 yards.
5 "	4 to 1	20.0 "	80 cubic feet = 3.0 yards.
6 "	4 to 1	22.7 "	90.9 cubic ft. = 3.4 yards.

Knowing the amount of material needed for 1,000 tile we can calculate the cost thereof if we know the prices. Many people have sand available at a few cents a load. It costs them something to haul it, but as the hauling is not usually included in comparing the cost of tile, we have used in this estimate a price of 15 cents per load for sand at the pit. I think that this is fairly representative of the price throughout the country. Cement is figured at $1.90 per barrel, that is 47½ cents per bag. At these prices the cost of material for 1,000 tile of various sizes figures out as follows:

Size of tile.	Strength of mixture.	Cost of cement for 1,000 tile.	Cost of sand for 1,000 tile.	Cost of sand and cement.
			cts.	
3 inch	7 to 1	$3.09	26	$3.35
3 "	6 to 1	3.61	26	3.86
3 "	5 to 1	4.32	26	4.58
3 "	4 to 1	5.41	26	5.67
3 "	3 to 1	6.65	24	6.89
4 "	4 to 1	7.17	33	7.50
5 "	4 to 1	9.50	45	9.95
6 "	4 to 1	10.78	51	11.29

Cost of Labor.

Of course the above table gives only the cost of material. To obtain the total cost the price of labor must be added. This we have not yet determined to our satisfaction. We have had two men working together on the experiments. In

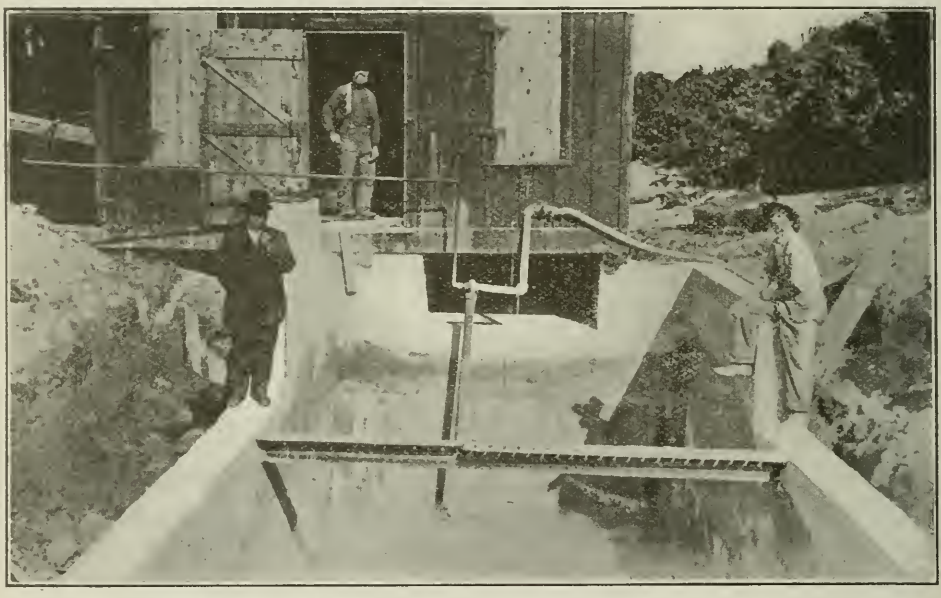

Fig. 13.—Pelee Island Marsh. Pump pit of east pump-house. The rectangle just under corner of building is the spillway through which the pumps will discharge the water into the lake.

one test they made 143 3-inch tile in three hours, which would mean 477 in a day of ten hours. But I am satisfied that they were not working to best advantage. Both worked on mixing the grout, the machine standing idle; then one turned the machine to make a tile while the other stood idle, then the other removed the tile, put in new mould and filled it, with the first man standing idle. So that there was considerable time wasted. In the next speed tests the work will be so divided that neither man nor machine will be standing idle any of the time. Under these conditions we expect to reach a speed of at least 600 three-inch tile per day. Some four-inch were made at the rate of 375 per day, but the same loss of time existed here as with the 3-inch. This will probably be increased to about 475 when loss of time is eliminated. Where the sand has to be sifted the rates may be slightly

less The tile have to be watered daily for a week, and this also might reduce the rate a little. But at the rates already mentioned it would take a shade under two days to make 1,000 3-inch tile and a shade over two days for 1,000 4-inch. Anyone knowing the rate of wages can calculate the price of his labour and can thus determine fairly closely what the total cost of the tile per 1,000 would be.

Of course the outlay for the machinery must also be considered. One has always to count on purchasing considerable in the way of extras, depending upon the type of machine. For some kinds palletts are needed, for others casings. or forms. One should have enough of these to run at least half a day without changing his machine to another size. We hope that later on we shall have another type of machine for testing.

What Strength to Make the Tile.

From a previous table (page 71) we can derive a hint as to the most desirable proportion in which to mix the sand and cement. The stronger the mixture the less the porosity, until a strength of 3 to 1 is reached. There the cement begins to affect the volume. If porosity is the thing to be desired the mixtures weaker than 4 to 1 should be used. If, on the contrary, compactness is the valuable quality, the proportion should be 4 to 1 or stronger. Porosity of tile is not essential to good drainage. In clay tile the water enters by the joints, practically none going through the pores, and good results are obtained. The joints of cement tile will prove just as efficient. In the past, cement tile have been strongly attacked on the ground that the cement is soluble in water, and it is to some extent. And if the tile are so open that the water enters through the pores the solubility is likely to be greater. Because porosity is not essential, because it tends to increase the solubility, and because strength is a very desirable quality, we believe that cement tile should be made in the proportions of 4 to 1 or stronger. In this view we are confirmed and supported by the experience and practice of many advocates of cement tile.

A Warning.

There is, we think, an element of grave danger in the cement tile situation, viz., that in some cases the tile made by inexperienced men will be of very inferior quality. To show how easy it is for this to occur we might note that if cement tile just made are exposed to strong sun or drying wind or both so that they dry in a few hours the "first set" of the tile is interfered with and the quality permanently injured. So that any who may think of making cement tile should take every precaution that no inferior tile are made, and if perchance any should be, they should be discarded rather than placed in the drains. It takes only one defective tile to render a whole drain useless.

All of which is respectfully submitted,

WILLIAM. H. DAY.

PART VI.

THE PROFESSOR OF CHEMISTRY.

To the President of the Ontario Agricultural College:—

SIR,—I have the honor to present herewith the report of the Department of Chemistry for the year 1910.

During the year there have been several changes in the personnel of the staff of the department. In April, W. P. Gamble, B.S.A., Professor of Soil Chemistry and Lecturer in Geology, severed his connection with the college. In Mr. Gamble the department lost an enthusiastic, capable and conscientious teacher and investigator; one whose work was much appreciated by both the students of the college and the farming community with which he came in contact. In July, A. E. Slater, B.S.A., Demonstrator in Chemistry, resigned to take charge of the chemistry work in the Mission College in Allahabad, North India. Mr. Slater was with us for only one year, but during that time rendered excellent service.

During the summer Mr. G. E. Smith of the Faculty of Applied Science, University of Toronto, and G. P. McKay, B.A., of McMaster University, Toronto, were appointed Demonstrator and Fellow, respectively. H. L. Fulmer, B.S.A., was advanced to the position of Lecturer and L. D. Jackson, B.A., promoted to that of a Demonstrator. I wish to record my appreciation of the hearty and capable manner in which these gentlemen and Miss Purdy, Demonstrator in Flour Testing, have fulfilled the various duties assigned to them. I also wish to thank you for your kindness in granting Mr. Fulmer an extension of his vacation period, which made it possible for him to take a three months' course at the University of Chicago to further fit himself for the duties devolving upon him.

These changes in the staff have necessitated some rearrangement of the work of the department and have somewhat hampered us in carrying out planned investigation work during the summer months.

INSTRUCTION.

A very large part of my time and those associated with me in the work of the department has been devoted to carrying out the prescribed courses of lectures and laboratory instruction. This work is fully outlined in the College calendar and has been referred to in previous reports; therefore it will not be necessary to make any detailed statement of it at this time. I may state, however, that owing to the increased number of students in attendance and the number of short courses now given, the teaching consumes a greater proportion of our time than formerly. This is especially true of the laboratory instruction, of which we naturally have a very large amount. Formerly one instructor could look after the second year class in practical work, the qualitative and quantitative analysis of the third year, or the Agricultural Specialists of the fourth year in soil and fodder analysis, whereas, now all these classes have become so large that it requires two or three instructors to look after the work properly. Furthermore, we have been adding new courses of study until we now give a series of lectures with laboratory work of the nature of Applied Chemistry, to each of the optional courses of study in the fourth year.

This, together with the lectures given to the students taking the short courses in Live Stock, Dairying, Poultry, and to the classes of Normal School students and Rural School teachers, now so fully occupy our time that we find it impossible to carry out any extended research work throughout the winter months, and, to a certain extent, it also hampers the summer work. Naturally, the teaching must be our first and most important duty, but I regret that we have been unable to do more to solve the many interesting problems that are continually presenting themselves in agriculture.

Another phase of instruction work which is continually assuming greater proportions is the giving of information by correspondence, articles published in the agricultural papers, bulletins, and by addressing farmers' meetings of various kinds. We are also annually called upon to present the results of our investigation work at the conventions of Dairymen, Fruit Growers, Millers and Bakers. More and more we find that men engaged in the handling or manufacturing of agricultural products are turning to us for information. These are all avenues by means of which we are privileged to spread the information we gather, and we cheerfully make use of them all.

During the past year I acted as referee on the separation of vegetable proteids in connection with the Association of Official Agricultural Chemists. This Association elaborates and tests methods of analysis of agricultural products, and the duty of a referee is to devise methods where none exist, or to improve existing methods and confirm the efficiency of these by sending out samples of materials to chemists who have signified their willingness to co-operate in the work to ascertain whether the suggested method is workable in the hands of other chemists and to present the results with recommendations at the annual meeting. When a method has been thoroughly tested in this way, it may be made a provisional or the official method of the Association. In this way the Association seeks to advance reliable methods of analysis and to unify the methods used throughout the country. Through your kindness I attended the meeting in Washington this fall and presented my report on the work done in collaboration with other chemists on the separation of some of the proteids of wheat flour. As this report was purely technical, I have thought it was not of sufficient general interest to include here.

Laboratory Work.

During the year we had a number of samples of miscellaneous materials sent to us for analysis. It would be impossible and unwise to do all the work of this nature that is asked of us. Many samples of commercial products have been received which we did not consider it our duty to analyse and the senders were referred to commercial chemists who are always glad to get work. Other samples had been taken in such a way that the result of an analysis would be useless, and still others, as for instance soils, were of such a nature that if analysed the results would be of little or no value. The samples we did examine and report on may be roughly classified as follows:

Cattle feeds	74
Insecticides and Fungicides	15
Suspected cases of poisoning	14
Suspected cases of adulteration	16
Soils	13
Fertilizers	5
Farm well water	28
Miscellaneous	15
Total	180

The samples of insecticides and fungicides analysed were principally arsenate of lead, Paris green and lime-sulphur washes. Seven of the suspected cases of poisoning were with chickens, while the rest consisted of flour from a mill that had been fumigated with hydrocyanic acid, wheat that was thought to have been poisoned, bees supposed to have been destroyed by gases from calcium carbide works, etc., etc. However, in no case were we able to prove the presence of poison. The samples suspected of adulteration were chiefly milk, cream, and butter. The miscellaneous samples consisted of a great variety of materials including some new and highly advertised egg preservatives, a sample of Russian eggs, yeast, rennet, yeast food, cleaning mixtures, etc. The results of these analysis, while interesting, are not of sufficient importance to incorporate here. The same is true in the case of the soils, but, after a brief discussion of the soil work, the full results of the analysis of the cattle feeds and water will be given.

Soils.

We have not made a particular study of soils during the past season. What little work we have done consisted of some partial analysis of samples submitted to us on which we could furnish some information. We have refused to make complete analyses of samples of arable soils, for, while the results are of service in giving the limits of plant food which a soil can provide, they are of disappointingly little use and frequently afford no information of value as to fertility or manurial requirements. To know what a soil contains is not enough, we must know something about the availability of the plant food constituents. For instance, the analyses of two soils may show that one contains larger quantities of nitrogen, potash and phosphoric acid than the other, yet the one with the lower amounts of plant food may produce the better crops, due to the difference in availability of the constituents. It follows, then, that the complete analyses of individual isolated samples of soil are of very little value. If, however, we could make a soil survey of the Province and analyse the different types of soil existing and follow this with crop and fertilizer experiments, in conjunction with different methods of cultivation to increase the availability of the plant food constituents as characteristically held in the various types of soils, we could then place crop production and manurial requirements of the soil on a much more intelligent and permanent basis. Such work is being done in some of the States, notably in Illinois, with excellent results. This would be a very extensive but valuable line of work, and one that I think might be worked out by this department and the department of Physics, in conjunction with the Agricultural District Representatives.

Fertilizers.

There is a strong, growing demand on the part of the farmers, but more especially by the market gardeners and fruit growers, for information regarding artificial fertilizers. These materials are expensive, and many farmers are using them without getting the desired results, due in many cases to the application of wrong materials through insufficient knowledge of the soil and plant requirements. In response to the demand for this work, we have done some co-operative experimental work with fertilizers, but, it is evident that such experiments do not start at the right point. We should first get as complete a knowledge of the soil as possible, through soil survey work as indicated under soils, and then build upon that.

Cattle Feeds.

The Commercial Feeding Stuffs Act, which came into force the first of January of this year, provides that no commercial feeding stuff can be legally offered for sale in the Dominion until it is registered with the Inland Revenue Department. It is then given a registration number, which, together with the guaranteed per cent. of protein, fat and fibre, must be affixed by the manufacturer or agent to every package of commercial feeding stuff sold or offered for sale. Many of the millers and manufacturers of the products asked us to analyse their feeds in order that they might secure the figures required for their guarantee. To aid them in complying with the Act we did make a number of analyses throughout the early part of the season, charging them the usual fee for the work; but later in the year we referred all such work to commercial chemists, where it more properly belongs. The results of the analyses of feeds made for this purpose, together with those obtained from other materials, are given in the following table:

Composition of Various Kinds of Cattle Feeds Analysed.

Serial No.	Name of Feed.	Moisture.	Crude Protein.	Crude Fat.	Crude Fibre.	Soluble Carbohydrates.	Ash.
	Corn Products:	%	%	%	%	%	%
254	Corn Oil Cake	.....	24.98	.....	.....	.....	.....
277	" " "	.....	21.94	.....	.....	.....	.....
278	" " "	.....	22.32	.....	.....	.....	.....
237	" " "	7.8	19.95	14.35	13.24	41.91	2.75
285	" " "	9.98	20.30	15.80	17.07	34.41	2.44
271	Corn Bran	.....	10.32	.....	.....	.....	.....
272	" "	.....	9.53	.....	.....	.....	.....
379	" "	8.38	9.01	7.95	12.30	59.13	3.23
273	Gluten Feed	.....	22.91	.....	.....	.....	.....
274	" "	.....	26.60	.....	.....	.....	.....
280	" "	.....	22.32	.....	.....	.....	.....
275	Gluten Meal	.....	32.82	.....	.....	.....	.....
276	" "	.....	32.48	.....	.....	.....	.....
279	" "	.....	18.62	.....	.....	.....	.....
281	" "	.....	33.42	.....	.....	.....	.....
398	"Acme" Corn Feed	6.5	10.49	8.18	10.9	61.49	2.44
404	Feed Corn	6.38	8.92	4.79	5.57	72.6	1.74
	Wheat Products:						
327	Bran	7.27	15.62	5.90	10.75	54.73	5.8
328	"	7.3	16.97	5.85	10.03	53.95	5.9
329	"	7.1	14.79	5.55	11.07	55.29	6.2
330	"	7.2	14.42	4.75	11.25	56.68	5.9
292	"	8.20	16.82	5.50	10.86	52.53	6.09
264	Shorts	9.10	16.10	4.91	9.04	56.69	4.16
289	"	9.86	18.38	6.02	7.99	53.98	3.77
427	"	.....	17.33	.....	.....	.....	.....
290	Middlings	9.89	18.36	6.04	7.51	64.46	3.74
288	Choice Middlings	10.29	16.25	4.39	5.20	60.74	2.65
385	Gluten Flour	10.20	12.82	1.37	.....	*74.95	.66
291	Feed Flour	10.37	16.23	3.90	3.29	63.93	2.28
	Oat Products:						
257	Kam Oats	8.05	13.04	2.41	11.69	61.88	2.93
268	" "	6.17	9.94	2.57	16.07	61.92	3.33
287	Oat Hulls	4.54	6.31	2.98	27.69	52.56	5.92
369	Oat Dust	7.16	15.9	7.00	15.07	51.57	3.30
370	Oat Feed	7.30	5.42	2.35	30.92	60.59	3.42
401	"	9.1	6.9	3.43	22.12	52.82	5.63
259	Coarsely Ground Oats	8.23	10.20	7.74	11.01	59.10	3.72

*Including fibre.

COMPOSITION OF VARIOUS KINDS OF CATTLE FEEDS ANALYSED.—Concluded.

Serial No.	Name of Feed.	Moisture.	Crude Protein.	Crude Fat.	Crude Fibre.	Soluble Carbohydrates.	Ash.
	BARLEY PRODUCTS:	%	%	%	%	%	%
267	Barley Dust	7.80	11.62	3.52	12.64	60.22	4.20
295	Barley Feed	7.61	13.27	3.97	5.98	63.90	5.27
	FLAX PRODUCTS:						
313	Flax Product	7.15	7.45	3.78	42.92	29.73	8.97
310	Oil Cake Meal	7.62	34.19	8.19	12.71	31.75	5.54
283	Oil Cake	9.11	37.82	8.11	10.43	28.05	6.48
284	" "	7.83	27.63	9.41	12.06	36.22	6.85
296	" "		32.64	5.31			
	MISCELLANEOUS PRODUCTS:						
376	Barley and Oat Hulls	8.17	17.43	2.57	19.96	58.89	2.98
377	Peas and Oat Hulls	9.31	10.15	1.82	22.10	53.62	3.00
399	Oat Hulls and Barley Feed	7.74	6.9	2.08	23.78	55.00	4.5
402	Pea Meal	5.82	24.01	1.92	10.6	54.97	2.68
301	Rice Meal	7.93	9.06	5.09	5.17	68.88	3.87
	MILL PRODUCTS.*						
294	Molasses Feed	16.70	6.19	1.95	4.60	51.27	19.29
307	Dairy Molasses Feed	17.20	12.44	1.79	12.19	49.89	6.49
308	" " "	16.12	14.65	1.88	10.43	51.63	5.29
317	Molasses Feed "A"	22.47	10.28	1.96	9.09	51.15	6.05
318	" " "B"	17.91	14.47	2.34	7.18	52.73	5.37
422	Molasses Meal "Bastol"	18.74	1.04	4.12	34.67	37.39	4.04
314	Molasses Feed†						
256	Model Feed	8.85	10.77	3.54	10.48	63.48	2.88
258	Ox Meal	9.69	16.50	3.44	5.89	61.16	3.32
260	Cattle Feed	11.04	11.55	3.38	6.64	62.24	5.15
262	Sample Feed No. 1	10.33	14.37	4.97	6.06	54.46	9.81
263	" " " 2	11.10	16.00	4.70	6.39	51.79	9.42
261	Chicken Feed	6.71	21.24	11.67	9.26	37.80	13.32
265	Sample Feed	8.59	13.75	3.35	14.05	57.13	3.13
266	Concentrated Cattle Feed	11.40	27.70	5.29	14.55	39.87	1.19
269	Ox Meal	6.90	17.03	4.20	7.29	60.38	4.20
270	Model Feed	6.42	11.06	3.73	12.55	63.14	3.10
293	Moullee	9.12	15.12	3.68	5.75	63.08	3.25
304	Waddell's Pig Feed	8.89	11.64	5.17	14.30	54.25	5.75
338	Jersey Brand	8.2	16.28	3.33	6.93	64.41	.85
389	Feed No. 1	8.79	9.25	5.07	13.87	53.3	9.72
390	" " 2	7.64	7.96	3.48	24.78	46.61	9.53
395	Quality Stock Food‡						
403	Crescent Feed	4.77	9.01	4.14	19.39	58.73	3.96
	SILAGE:						
321	Corn Husk Silage	80.45	1.17	.87	7.04	9.80	.67
326	Pea Vine Silage	73.98	3.69	1.33	9.09	10.03	1.88
19	Corn Silage	72.31	1.38	.41	6.66	17.87	1.37

*Mill products whose names give no indication of their probable composition.
†Not fully analysed—contains chlorine equivalent to 6.9% of common salt.
‡Not fully analysed—contains chlorine equivalent to 98.0% of common salt.

The above figures do not call for any particular comment. It may be stated, however, that it is very doubtful if it will pay any farmer who has plenty of home grown roughage to purchase feeds carrying less than 8 or 9 per cent. of protein.

What he requires is feeds rich in protein to supplement the deficiency of this constituent in the cheap home-grown fodders.

The two samples of silage given at the last of the table are by-products from the canning factory and are the only ones of the kind we have ever analysed. Both samples were in good condition when received. For comparison, we have included the composition of a sample of corn silage made from corn put into the silo when the grain was between the dough and glazed condition. It is evident that the pea vine silage is richer in protein than the corn product, but the vines had a mussy appearance and it is doubtful if they would be relished by stock as much as the corn silage. The corn husks, while bright and fresh in appearance, naturally are not a rich food. However, it is quite possible that, provided the green materials are put into the silo before any spoiling occurs, both materials may be used as roughage in the ration and thus bring into use these by-products of the canning factory.

Farm Well Water.

The water of shallow wells will be pure or impure as the soil around them is pure or contaminated. This is not true of water from wells drilled into the rock, provided the well is properly cased to prevent the surface water getting into it; but it is absolutely true of the shallow dug well. An ordinary well is but a hole in the ground, and, naturally, it collects the seepage water from the surrounding soil. Consequently, if this soil is saturated with foul and polluted matters, the water that passes through it will be contaminated.

The earth is naturally a good purifying agent, consequently a well may be dug close to a water closet, cess pool, barnyard, or the slops from the house may be thrown on the ground near the well, and provided none of it runs directly into the well, the water may not be contaminated. But such a condition cannot last long. The water from these sources of pollution doubtless makes its way into the well, but the soil through which it soaked absorbed the impurities and the water passed on pure. It must follow, however, that as time goes on the polluted matters must get nearer and nearer to the well, until finally the soil is so overloaded with impurities that it loses its power of filtering and purifying the water and some of the impure matters find their way into the well. In such a well there may be a good spring of pure water, but how can the water remain pure if all manner of filth is carried into the well in the seepage water? It is because this is prevented in the bored and cased wells that purer water is obtained from them than from the shallow, dug wells.

Sometimes when we have been compelled to report that the results of our analysis of a water lead us to believe that the water is unfit for use, correspondents have asked if they thoroughly clean the well will the water not be all right. It is evident that cleaning the well is a good thing and that it should be done frequently, but if the water is contaminated from the soil through which it passes in getting into the well, it is apparent that cleaning the well alone will not purify the water. Recently we received a sample of water from a well dug close to the barnyard. The water at one time was considered a good article, but it had become impure. The barns and barnyard were removed to another location, the well was thoroughly cleaned and it was hoped that the water would be better. Analysis showed that the water was loaded with decaying organic matter. The well had been cleaned, the barnyard moved, but the soil was still loaded with the impurities which the soakage from the barnyard had been building up for years, and it will probably take years to cleanse the soil again.

During the past summer we have been asked to analyse more samples of water

from farm wells than usual. We have not found all the water impure, but the results show that a very large proportion of it was badly contaminated with decaying organic matter. Comparatively few show any sewage contamination and still fewer give results that indicate that the organic matter is directly of animal origin. In most cases the impurities are, apparently, from a vegetable source. Such a water is not necessarily unfit for use, but it contains materials needful for the development of disease and other forms of organisms, and when we realize how easily this water may be contaminated with disease germs, we very rightly look upon such water with suspicion.

The results of the ordinary chemical analysis of water do not allow of an absolutely clear and definite interpretation; but it is generally considered that more than 40 grains per gallon, or 570 parts per million of total solids, is undesirable. Chlorine may be derived from soluble chlorides in the soil or rock, and a knowledge of the amount of this constituent natural to the water of the district is necessary to the proper interpretation of the analysis; but, when there is found to be over 100 parts per million of chlorine in the water and, especially if associated with large amounts of free ammonia, the water must be regarded with a great deal of suspicion.

The organic matter is determined as free and albuminoid ammonia. The latter form is considered the more harmful, and when there is more than .10 parts per million present the water should be regarded with suspicion, and when the analysis shows as much as .15 parts per million of albuminoid ammonia the water is unsafe, if not positively unfit for domestic purposes.

SAMPLES OF WATER ANALYSED IN 1910

Water.	Total Solids,	Chlorine.	Free Ammonia.	Albuminoid Ammonia.
	Parts per million.	Parts per million.	Parts per million.	Parts per million.
1. Well water	238.	14.	.04	.18
2. do	423.	6.	.008	.008
3. Spring water	270.	10.	.03	.05
4. do	.....	10.	.026	.052
5. Well water	929.	86.	.28	.142
6. Spring-well water	188.8	3.0	.08	.08
7. Well water	400.	15.	trace	.15
8. do	1266.	127.6	.04	.125
9. do	.....	35.4	.532	.564
10. do	295.	7.	.075	.160
11. do	.....	21.	.060	.160
12. do	400.	35.45	.106	.200
13. do	1178.	182.	.32	.45
14. do	356.	1.42	.02	.20
15. do	506.	.85	.12	.20
16. do	3294.	189.	.54	.30
17. New well water	.....	1225.	.80	.18
18. Old well water	443.	28.	.212	.68
19. Tank water	.....	581.	.20	.08
20. Well water	.....	581.	.26	.12
21. do	410.	17.5	1.06	.20
22. do	1707.	217.	*.....	.60
23. do	183.	6.	.10	.16
24 do	402.	28.	.03	.11
25. do	986.	.54	trace	.18
26. do	2878.	479.2	.03	.40
27. do	276.	12.	.08	.16
28. do	527.	36.6	.18	.06

* Free ammonia too high to determine in ordinary way.

It is not necessary to comment on every analysis. Samples Nos. 2, 3, 4 and 6 may be regarded safe, while Nos. 7, 8 and 24 give results so high in albuminoid ammonia that they must be viewed with suspicion, and the balance are absolutely unfit for domestic purposes.

In most of the European countries the sanitary officers have long ago insisted on all ground water being taken from lower levels in such a way as to prevent any seepage water from the surface soil getting into it. We are gradually working in the same direction, our cities and towns are going to great expense to get pure water, and in the country we find every year an increasing number of wells being drilled into the rock. We must get away from the shallow wells if we are going to have the good, pure water we require and which nature has so abundantly supplied for us. These wells may furnish pure water in a new country that is sparsely settled, but in the older districts, if we are going to have wells near our buildings, they must be so arranged that the water is brought up from the lower strata and in such a manner that it is not contaminated with the seepage water from the surface soil.

Flour and Wheat Testing.

During the past year two hundred and forty samples of flour and three samples of wheat were sent to us for examination. So far we have done very little work for the millers and none for the bakers on the wheat or flour of the 1910 crop. This is probably due to the fact that there was a sufficient supply of the old wheat in the country to render it unnecessary for the millers to commence at once on the new crop, and, also, to the fact that the new wheat gives a flour fully as strong as the old wheat.

Each year as soon as the wheat from the West is available we secure samples of the different grades. These are ground and baked to determine the strength, or bread producing value, of the wheat in comparison with that of the previous year. This year only two grades, Nos. 1 and 2 Northern, were tested and the results, together with those of the same grade of the previous year, and the comparative tests of Ontario wheat of the 1909 and 1910 crops are given in the following table:

Name.	Wet Gluten.	Absorption.	Yield.	Volume.	Color.	Texture	Appearance.	Protein in wheat
	%	%	grams.	c. c.				%
No. 1 Nor., 1909 crop...	33.34	69.4	521	2,850	100.0	100.0	100.0	14.64
No. 1 Nor., 1910 " ..	38.60	65.8	504	2,950	102.0	101.0	101.0	16.20
No. 2 Nor., 1909 crop...	38.13	69.4	510	2,850	100.0	100.0	100.0	15.15
No. 2 Nor., 1910 " ..	40.34	63.2	495	2,850	99.5	100.5	100.5	14.82
100% Ont., 1909 crop...	29.17	48.8	471	1,770	100.0	100.0	100.0	.....
100% " 1910 " ..	28.43	45.8	462	1,870	102.0	105.0	101.0	.....

For some reason, new wheat flour always gives a higher percentage of wet gluten than the same flour will when aged. This will partly account for the higher figures for the 1910 crop. The water absorption is lower, but that is only natural when new wheat is compared with old wheat that had been kept in a dry place for 12 months. In all other respects the flour from the new wheat is fully

equal to that from the old wheat, and, when we consider the advantage due to ageing of the latter, it is plainly evident that the miller has nothing to fear in milling the wheat of the 1910 crop.

INVESTIGATION WORK.

Baking Tests of Varieties of Wheats.

Table Showing Results of Baking Tests with Ontario Spring Wheats.

Name of Variety.	Crop.	Wet Gluten.	Absorption.	Yield.	Volume.	Color.	Texture.	Appearance.	Protein in flour.
		%	%	Grms.	cc.	%	%	%	%
Standard	1909	38.70	54.7	467	2,570	100.0	100.0	100.0	.....
Preston Springs	1909	38.90	51.8	466	2,420	98.0	102.0	99.0	11.16
Red Fern	1909	33.93	48.8	465	2,070	97.0	80.0	90.0	11.1
White Russian	1909	36.07	48.8	454	2,300	104.0	99.5	99.0	11.1
Red Fife	1909	40.0	48.8	459	2,320	102.0	100.0	99.0	11.43
White Fife	1909	39.20	53.5	467	2,480	102.0	100.0	100.0	12.25
Pringle's Champion	1909	32.17	48.8	470	2,160	98.0	95.0	90.0	10.61
Perron White	1919	31.96	48.8	460	2,200	100.0	96.0	95.0	10.66
Perron Red	1909	36.40	50.0	467	2,190	100.0	100.0	100.0	11.79
*Sask. Sweepstakes	1909	37.47	51.8	470	2,400	103.0	102.0	100.0	11.64
Ontario Emmer	1909	36.13	57.6	489	1,860	97.0	.....	.....	11.27
Gatineau	1909	40.90	51.8	470	2,440	101.0	100.0	100,0	12.82
Minnesota 163	1909	37.83	51.8	467	2,310	102.0	97.0	98.0	12.08
Minnesota 169	1909	38.07	50.6	474	2,200	101.0	99.0	97.0	11.67
Early Java	1909	38.20	51.8	468	2,560	101.0	100.0	100.0	11.71
Hungarian	1909	32.17	50.0	465	2,280	103.0	102.0	99.0	11.52
Russian Arg	1909	38.00	50.0	470	2,300	100.5	102.0	99.0	12.65
French	1909	39.53	48.8	464	2,460	103.0	102.0	99.0	12.00
French Bald	1909	37.17	48.8	465	1,990	100.0	100.0	97.0	11.88
Climax	1909	38.60	48.8	469	2,060	98.0	90.0	90.0	11.1
Herison (Bearded)	1909	37.20	48.8	458	2,250	100.0	100.0	98.0	11.83
Carleton	1909	34.67	48.8	468	1,950	96.0	90.0	90.0	11.00
Chubut	1909	36.63	54.1	479	2,230	99.5	93.0	98.0	11.68
Early Wonder	1909	38.43	54.7	478	2,150	103.0	102.0	98.0	12.26
Wellman Fife	1909	36.10	48.8	459	2,340	102.0	99.0	99.0	11.28
Persian	1909	44.37	72.3	525	2,130	.....	.....	.....	15.42
Saxonka	1909	32.70	48.8	475	1,920	98.0	94.0	95.0	10.94
Chappel	1909	31.33	48.8	460	2,099	100.0	95.0	90.0	10.57
Queensland	1909	39.93	51.8	458	2,160	101.0	99.5	95.0	11.4
Seven Headed	1909	33.97	54.7	498	1,700	.....	80.0	.....	10.68
Kolben	1909	41.50	54.7	471	2,420	103.0	100.0	100.0	12.56
Polish	1909	40.0	60.6	504	1,750	.....	80.0	.....	13.09
Kubanka	1909	37.10	57.6	487	2,110	90.0	95.5	90.0	10.96
Medeah	1909	39.93	63.2	504	1,830	yellow	80.0	.....	12.51
Arnantka	1909	34.83	57.6	490	1,850	"	90.0	.....	11.48
Sorentina	1909	38.90	66.5	510	1,700	"	80.0	.....	13.25
Triticum	1909	37.10	58.8	488	2,070	"	95.0	90.0	11.71
Jumillo	1909	38.15	63.2	512	1,660	.....	.....	.....	.....
Wild Goose	1909	35.85	57.6	485	2,110	yellow	93.0	90.0	12.24
Algiers	1909	36.65	61.7	509	1,660	.....	.....	.....	12.4
Bart Tremenia	1909	38.30	63.2	520	1,740	95.0	.....	.....	11.75
Blue Democrat	1909	35.05	48.8	471	2,030	101.0	95.0	90.0	11.27
Roumania	1909	38.80	62.4	512	1,770	90.0	.....	.....	10,83
*Alberta Sweepstakes	1909	37.60	51.8	474	2,430	103.0	99.5	90.0	12.14
Hartz Mts	1909	40.60	48.8	462	2,200	100.0	96.0	96.0	12.6
Colorado	1909	33.37	48.8	469	2,170	99.0	97.0	95.0	10.85

* Samples grown on our Experimental Plots from wheat which took the sweepstake prize in Saskatchewan and Alberta in 1908.

Ontario Grown Spring Wheats. We have milled and baked all the varieties of spring wheats grown on the experimental plots in 1908 and 1909. Because of the difficulty experienced in milling some of these wheats, especially those of the Durum type, we have not included the results of the tests with the flours obtained from the 1908 crop. This difficulty has not been entirely overcome, but better results were obtained with the wheat grown in 1909 and we give these in the foregoing table. When no figures are given for color, texture, or for the appearance of the loaf, it is because the bread was so poor that it was impossible to assign a proper figure. As in all our comparative test work, 340 grams of flour are used for a test. The weight of the loaf in grams and its volume in cubic centimetres are given, and the color and texture of the bread, and the general appearance of the loaf, are given in the percentage of the standard loaf, which in this case was made from an 85 per cent. Manitoba flour. Thus it will be seen that the flour made on our own little mill is compared with a commercial 85 per cent. grade from the Western spring wheats.

It will be noticed that there are several varieties of wheat that give a higher percentage of wet gluten than the standard. These are principally varieties of the Durum type. The grain is very hard and we have never been able to make a flour that will give a loaf of bread of a volume and texture in proportion to the gluten or protein content. As a rule, the loaf was small and the bread yellow in color and of a coarse, open texture. In many cases the bread was so poor that no attempt was made to allot a mark for color, texture and appearance. The size of the loaf is possibly the best indication of the expansive power of the gluten in normal flour. Early Java came the nearest to the standard in this respect. Several others came very close and were superior in color and texture. Without trying to give too much importance to these baking tests of one year's crop, it may be pointed out that Early Java gave the best all-round results, while French, Gatineau, Red and White Fife, White Russian and Preston Springs gave results which compared wonderfully well with the Manitoba grown Standard.

Winter Wheats. The results of baking tests of the winter wheats grown on the Experimental plots in 1907 and 1908 have been given in previous reports. This year we report the results of the tests of the wheat of the 1909 and 1910 crop. The varieties grown from year to year are always subject to some changes, but there was more than the usual number dropped in 1910, and, as an equal number of new varieties were not added, we have fewer to report on this year. In baking the flours from the 1910 crop so early in the season, and thus not allowing them the same time for ageing as in former years, we are placing this crop at a slight disadvantage with other years; but it was thought that getting the results into the report a year earlier was of sufficient importance to offset this, especially as it does not impair in any way the comparison between the quality of the wheats grown in 1910. The method of testing was the same as in previous years and the same as outlined under spring wheats. The standard used in this case was, however, a straight grade flour from mixed fall wheats made in one of our large flour mills.

TABLE SHOWING RESULTS OF BAKING TESTS WITH ONTARIO WINTER WHEATS.

Name of Variety.	Crop.	Wet Gluten.	Absorption.	Yield.	Volume.	Color.	Texture.	Appearance	Protein in flour.
		%	%	Grms.	c.c.	%	%	%	%
Standard	1909	28.10	47.6	466	1,810	100.0	100.0	100.0	.....
	1910	28.43	46.0	459	1,820	100.0	100.0	100.0	8.69
Abundance	1909	28.13	51.2	480	1,590	100.0	100.0	97.0	8.77
	1910	21.86	48.8	483	1,460	103.0	97.0	94.0	7.48
Alberta Red	1909	38.73	52.9	487	2,140	98.0	102.5	106.0	10.26
	1910	30.13	53.5	491	1,930	100.0	103.0	102.0	8.93
Amherst Isle	1909	37.73	52.3	478	2,200	101.0	102.0	108.0	10.41
	1910	29.13	50.6	475	1,860	105.0	103.0	104.0	9.22
American Banner	1909	29.03	48.8	478	1,640	98.0	97.0	100.0	8.15
	1910	24.03	48.8	488	1,460	100.0	90.0	90.0	6.73
American Wonder	1909	29.53	53.5	492	1.650	95.0	95.0	98.0	9.5
	1910	23.76	48.8	477	1,440	99.0	.....	.....	7.02
Banatka	1909	37.03	52.9	492	2,550	103.0	110.0	120.0	11.66
	1910	29.40	53.5	477	2.190	102.0	98.0	102.0	9.37
Buda Pesth	1909	38.33	51.8	473	2,350	100.0	108.0	112.0	11.91
	1910	33.90	51.8	476	1,880	103.0	100.0	102.0	10.75
Bulgarian	1909	36.60	52.9	491	2,140	100.0	103.0	110.0	10.69
	1910	29.13	51.8	474	1,970	103.0	101.0	102.0	9.55
Crimean Red	1909	36.33	52.3	483	2,280	100.0	103.0	105.0	12.30
	1910	28.27	56.0	493	2,060	102.0	98.0	100.0	9.41
Dawson's Golden Chaff	1909	29.73	48.8	471	1,660	98.0	103.0	102.0	8.34
	1910	30.13	48.8	463	1,710	100.0	100.0	100.0	9.07
Early Genesee Giant	1909	31.07	51.2	483	1,940	100.0	103.0	104.0	10.10
	1910	25.80	50.0	475	1,720	104.0	100.0	100.0	8.24
Early Red Clawson	1909	29.93	50.0	473	1,720	98.0	97.0	100.0	7.98
	1910	24.86	50.0	476	1,400	100.0	.....	.....	8.72
Egyptian Amber	1909	32.40	52.3	474	2,080	100.0	103.0	103.0	10.54
	1910	30.00	52.8	478	1,930	104.0	102.5	102.0	9.52
Farmers' Friend	1909	34.83	51.2	475	2,130	98.0	104.0	106.0	9.57
	1910	32.20	50.6	477	1,860	102.5	102.0	101.5	9.52
Geneva	1909	38.07	51.2	476	2,180	103.0	107.0	110.0	11.30
	1910	33.63	48.8	469	1,740	102.0	102.0	100.0	10.03
Genesee Reliable	1909	35.10	49.4	469	2,090	101.0	102.0	108.0	9.90
	1910	29.53	50.0	475	1,810	104.0	104.0	101.0	8.7
Imperial Amber	1909	36.20	50.0	489	2,010	100.0	105.0	105.0	10.05
	1910	31.20	51.8	472	1,930	104.0	104.0	102.0	9.44
Kentucky Giant	1909	34.57	48.8	474	2,220	102.0	104.0	110.0	10.66
	1910	30.03	50.6	487	1,930	103.0	102.0	102.0	9.19
Kharkoo Winter	1910	33.56	55.9	498	1,890	103.0	101.0	102.0	9.63
Gillespie White No. 215	1910	19.00	50.0	474	1,600	100.0	80.0	80.0	7.09

TABLE SHOWING RESULTS OF BAKING TESTS WITH ONTARIO WINTER WHEATS.—Con.

Name of Variety.	Crop.	Wet Gluten.	Absorption.	Yield.	Volume.	Color.	Texture.	Appearance	Protein in flour.
		%	%	Grms.	c.c.	%	%	%	
Gillespie Red No. 216	1910	25.56	50.0	472	1,660	100.0	.....	.....	8.25
Grand Prize	1910	24.27	49.4	478	1,590	102.0	85.0	90.0	7.82
Manitoba Red Fife	1909	32.40	51.2	483	1,760	98.0	98.0	100.0	10.73
	1910	27.63	48.8	468	1,610	101.0	99.0	99.0	9.04
Michigan Amber	1909	33.93	51.2	480	2,120	104.0	107.0	110.0	9.84
	1910	28.70	50.0	480	2,000	104.0	97.0	102.0	9.46
McGarvin	1909	36.60	50.0	473	2,120	101.0	101.0	108.0	10.68
	1910	29.17	50.0	477	1,700	102.0	98.0	100.0	9.37
McPherson	1909	37.80	48.8	463	1,980	98.0	101.0	103.0	10.66
	1910	28.93	48.8	476	1,920	104.5	103.0	104.0	9.69
New Mammoth Amber	1909	31.20	48.8	486	1,650	100.0	97.0	100.0	10.31
	1910	24.73	50.0	497	1,530	103.0	95.0	96.0	8.42
Nigger Wheat	1909	34.70	50.6	478	1,870	94.0	97.0	104.0	11.08
	1910	30.86	51.2	471	1,710	103.0	100.0	96.5	8.21
No. 5 Red Wheat	1909	37.57	59.4	502	2,010	98.0	100.0	101.0	10.63
	1910	32.03	56.0	499	2,030	102.0	98.0	102.0	8.83
Northwester	1909	31.37	48.8	468	2,060	98.0	102.0	104.0	10.43
	1910	29.73	50.0	475	1,870	104.0	100.0	100.0	9.42
New Perfection	1909	31.53	50.6	473	2,230	101.0	101.0	110.0	10.0
	1910	29.47	50.0	471	2,140	104.0	104.0	105.0	9.53
Paramount	1909	36.33	51.2	476	1,730	98.0	97.0	99.0	8.33
	1910	27.40	49.4	475	1,700	104.0	90.0	100.0	8.37
Plymouth	1909	27.87	48.8	474	1,550	98.0	98.0	99.0	.....
	1910	21.90	47.6	471	1,440	102.0	.....	80.0	7.50
Prosperity	1909	30.0	51.2	473	1,580	96.0	90.0	90.0	10.20
	1910	23.53	46.3	473	1,580	102.0	100.0	90.0	7.94
Red Wave	1909	26.53	48.8	487	1,600	98.0	95.0	96.0	8.63
	1910	23.73	48.8	480	1,510	102.0	80.0	80.0	7.98
Rudy	1909	34.17	50.0	469	2,210	103.0	108.0	110.0	10.78
	1910	33.93	52.3	474	2,020	103.0	99.0	101.0	9.23
Scott	1909	37.67	53.5	495	2,220	101.0	106.0	106.0	10.88
	1910	28.60	51.2	478	1,840	103.0	102.0	102.0	9.23
Silver Queen	1909	34.93	48.8	471	1,640	97.0	95.0	98.0	10.55
	1910	33.66	50.0	485	1,470	103.0	100.0	95.0	9.86
Tasmania Red	1909	37.13	55.9	485	2,250	102.0	106.0	108.0	11.25
	1910	33.50	50.0	480	1,940	102.0	102.0	102.0	9.55
Treadwell	1909	35.83	51.8	487	2,000	98.0	98.0	106.0	10.08
	1910	30.73	51.2	485	1,850	104.0	100.0	102.5	8.68
Tuscan Isle	1909	36.17	50.6	467	2,340	98.0	102.0	110.0	11.85
	1910	30.10	51.2	473	2,010	103.0	102.0	102.0	9.4
Yarsolaf	1909	36.17	48.8	475	2,250	99.0	104.0	110.0	10.31
	1910	31.13	53.5	473	2,130	98.0	100.0	102.0	9.43

TABLE SHOWING RESULTS OF BAKING TESTS WITH ONTARIO WINTER WHEATS.—Con.

Name of Variety.	Crop.	Wet Gluten.	Absorption.	Yield.	Volume.	Color.	Texture.	Appearance	Protein in flour.
		%	%	Grms.	c.c.	%	%	%	%
Arctic Junior	1909	34.90	50.0	478	2,130	100.0	108.0	112.0	10.49
Auburn	1909	38.80	52.3	482	2.080	100.0	103.0	104.0	11.20
Bearded Pootung	1909	30.40	52.3	481	1,960	102.0	104.0	103.0	9.18
Beardless Rural New Yorker.	1909	29.07	48.8	479	1,520	95.0	90.0	95.0	8.77
Clawson Longberry	1909	31.30	52.3	484	1,660	99.0	100.0	95.0	9.32
Economy	1909	33.23	50.0	473	2,090	98.0	102.5	104.0	10.20
Early Ontario	1909	32.87	53.5	482	2,000	102.0	104.0	104.0	9.89
Extra Early Windsor	1909	27.00	52.3	476	1,540	100.0	100.0	95.0	.....
Forty Fold	1909	26.03	48.8	470	1,680	103.0	104.0	102.0	8.40
Ghirka	1909	35.95	52.9	488	2.040	100.0	104.0	103.0	.....
Harvest King	1909	35.07	50.0	472	1,710	98.0	100.0	95.0	9.95
Iron Clad	1909	37.57	50.6	468	1,980	101.0	104.0	110.0	.....
Mogul	1909	31.03	48.8	473	1,460	98.0	90.0	85.0	10.5
Monarch	1909	31.47	48.8	470	1,940	101.0	103.0	102.0	8.57
New Paris Prize	1909	28.97	48.8	476	1.830	102.0	102.0	100.0	8.72
No. 8 Red Wheat	1909	31.10	48.8	474	1.770	97.0	100.0	100.0	9.50
Onigara	1909	32.77	51.2	471	2,080	100.0	101.0	112.0	9.86
Prize Taker	1909	29.20	51.2	482	1.690	98.0	96.0	99.0	10.26
Red Hussar	1909	31.00	48.8	479	1,550	95.0	90.0	95.0	8.34
Royalty	1909	30.87	48.8	467	1,680	98.0	97.0	100.0	9.34
Russian Amber	1909	35.87	51.2	474	2,060	100.0	100.0	102.0	8.70
Superlative	1909	28.17	51.8	487	1,500	95.0	95.0	90,0	8.68
Turkey Red	1909	35.00	50.0	466	2,090	104.0	100.0	112.0	10.47
	1910	30.70	52.3	476	1.920	103.0	102.5	102.0	.....

This table presents some striking proofs of the wide variations in the quality of wheat from two seasons. The most noticeable point of difference between the two crops is in the percentage of wet gluten. Dawson's Golden Chaff is the only variety in the 1910 crop that contained as much gluten as was found in the same variety the previous year, while many of the other varieties contained 5, and some over 8 per cent. less gluten. This wide difference in gluten content is confirmed by the protein determinations given in the last column. The gluten is, however, much better in quality, being firmer and more elastic. The two crops show no regular

difference in water absorption, although some moisture determinations, not reported here, indicate that the flour from the 1909 crop was the more moist at the time of baking.

From our experience we think it is quite probable that if the wheat of the 1910 crop had been given the same chance to improve by ageing as the 1909 crop, the volume of the loaf would have been increased by fully 200 cubic centimetres. This would make the volume of the loaf of bread from the two crops nearly equal. The color of the flour from the 1910 crop is much the better of the two and the texture was fully as good, if not better. This is not shown in the table, as the standard for 1910 was very much the better in texture. It is thus evident that, although there is such a wide difference in some respects, the two crops are not very far apart in the quality of the bread they will produce.

With reference to the comparison of the varieties grown this year, the figures speak for themselves. It is, however, very evident that the quality of the wheat as shown by baking tests varies from year to year. The improvement in the quality of Dawson's Golden Chaff is very noticeable.

Effect of Mill Fumigants Upon Flour.

Two years ago we treated some wheat and flour with carbon bisulphide to destroy the grain weevil, and, while it is quite possible that the carbon bisulphide was used in larger quantities than would be necessary in fumigating a mill, it is true that both the wheat and the flour were very badly affected. The flour was utterly useless for making bread, and the flour produced from the wheat was no better. We kept samples of this on hand to determine whether the flour would improve on keeping. This experience led us to carry out some experiments, with carbon bisulphide and other fumigating materials.

In September, 1909, three samples of five pounds each of an 85 per cent. Manitoba flour were treated in a confined space with carbon bisulphide, hydrocyanic acid gas, and sulphur. The quantity used in each case was approximately the same as would be used per cubic foot in fumigating a mill. It was fully expected that the sulphur would be very injurious in its effects, but for the sake of comparison it was included in the tests. The flour was left in contact with the gases for twenty-four hours. After exposing to the air for another twenty-four hours, it was baked according to the method used in all our flour testing work. In this work we use 12 ounces of flour for each loaf of bread, and the dough is made with water in which the yeast, salt and a small amount of sugar is placed. The hydrocyanic acid treated flour rose well and handled in every way similar to the normal flour. The carbon bisulphide and sulphur treated samples did not rise well and this was especially true of the sulphur treated sample. Great difficulty was experienced in making dough from the latter, as it was very sticky and fluid-like. In the early part of November, two months from the time of the fumigation of the flour, a second baking was made of the samples, and two and a half months later, that is, towards the end of February, a third baking was made. The results of these baking trials are recorded in the following table. The yield of bread is given in grams and the size of the loaf in cubic centimetres. The color, texture and general appearance of the bread were scored in percentage of the normal sample, which was marked at 100.

Fig. 1: First Baking, Sept. 24th, 1909.

1. Loaf from normal Manitoba flour.
2. Loaf from carbon bisulphide treated flour.
3. Loaf from hydrocyanic acid gas treated flour.
4. Loaf from sulphur treated flour.

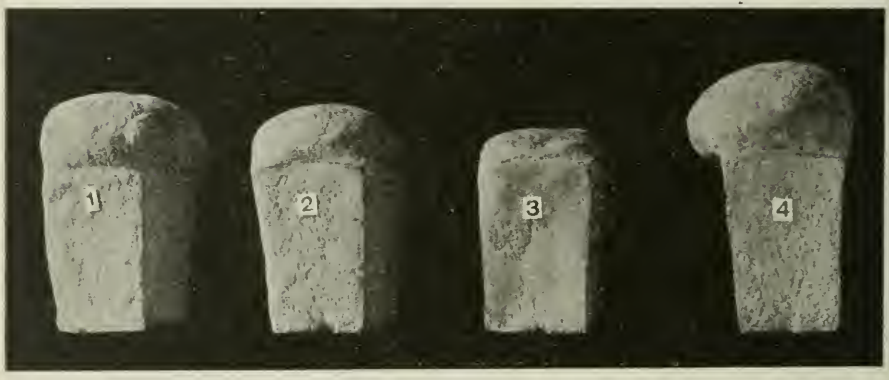

Fig. 2: Second Baking, Nov. 8th, 1909.

1. Loaf from normal Manitoba flour.
2. Loaf from carbon bisulphide treated flour.
3. Loaf from sulphur treated flour.
4. Loaf from hydrocyanic acid gas treated flour.

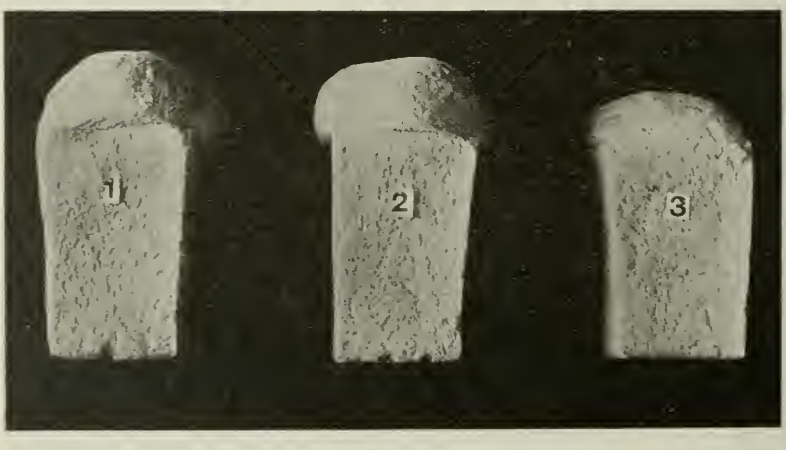

Fig. 3: Third Baking, Feb. 23rd, 1910.

1. Loaf from normal Manitoba flour.
2. Loaf from carbon bisulphide treated flour.
3. Loaf from sulphur treated flour.

Fig. 4: First Baking, Sept. 24th, 1909.
1. Loaf from normal Ontario flour.
2. Loaf from sulphur treated flour.
3. Loaf from hydrocyanic acid gas treated flour.
4. Loaf from carbon bisulphide treated flour.

Fig. 5: Second Baking, Nov. 8th, 1909.
1. Loaf from normal Ontario flour.
2. Loaf from carbon bisulphide treated flour.
3. Loaf from sulphur treated flour.
4. Loaf from hydrocyanic acid gas treated flour.

Fig. 6: Third Baking, Feb. 24th, 1910.
1. Loaf from normal Ontario flour.
2. Loaf from carbon bisulphide treated flour.
3. Loaf from sulphur treated flour.

TABLE I.—85 PER CENT. MANITOBA HARD FLOUR.

First Test—Baked Sept. 24th, 1909.

Flour.	Gluten.	Absorption.	Yield of Bread.	Size of Loaf.	Color.	Texture.	Appearance.
Normal	36.43	61.8	500	2,660	100.0	100.0	100.0
Sulphur	†.....	60.6	500	1,730	poor	poor	not good
Hydrocyanic acid	36.00	61.8	500	2,670	99.5	98.0	100.0
Carbon bisulphide	36.90	61.1	510	1,650	90.0	poor	not good

Second Test—Baked Nov. 8th, 1909.

Normal	36.43	63.5	512	2,670	100.0	100.0	100.0
Sulphur	†.....	55.9	476	1,850	.....	25.0	.....
Hydrocyanic acid	36.20	63.5	501	2,700	101.0	101.0	103.0
Carbon bisulphide	36.67	63.5	503	2,290	90.0	30.0	75.0

Third Test—Baked Feb. 23rd, 1910.

Normal	†.....	67.7	501	2,490	100.0	100.0	100.0
Sulphur	†.....	54.7	485	1,920	95.0	40.0	50.0
Carbon bisulphide	†.....	63.5	520	2,170	96.0	50.0	75.0

† Flour so soft and stringy it could not be washed.

The accompanying cuts also illustrate the appearance of the loaves of the three different bakings shortly after they were taken from the oven. The experiment was repeated with Ontario winter wheat flour, and Table II. illustrates the results of the baking trials with the soft flour.

TABLE II.—STRAIGHT GRADE, ONTARIO FLOUR.

First Test—Baked Sept. 27th, 1909.

Flour.	Gluten	Absorption.	Yield of Bread.	Size of Loaf.	Color.	Texture.	Appearance.
Normal	30.10	47.3	476	1,620	.....	.....	.....
Sulphur	*.....	41.4	467	920	.....	.....	.....
Hydrocyanic acid	30.07	47.3	474	1,610	.....	.....	.....
Carbon bisulphide	29.33	47.1	477	1,400	.....	.....	.....

Second Test—Baked Nov. 8th, 1909.

Normal	*.....	47.6	478	1,620	100.0	100.0	100.0
Sulphur	*.....	47.6	481	1,220	.....	.....	.....
Hydrocyanic acid	*.....	47.6	471	1,720	100.0	99.0	101.0
Carbon bisulphide	*.....	47.6	479	1,430	98.0	90.0	95.0

Third Test—Baked Feb. 24th, 1910.

Normal	*.....	50.0	481	1,820	100.0	100.0	100.0
Sulphur	*.....	42.9	452	1,330	sickly	white	.....
Carbon bisulphide	*.....	48.8	473	1,720	100.0	90.0	99.0

*Flour so soft and stringy it could not be washed.

It is evident that the hydrocyanic acid treatment did not in any way destroy the bread, in fact, in some cases it would almost seem to have improved the flour; whereas the carbon bisulphide and sulphur treatment did injure the flour. The loaves were smaller, darker in color, poorer in texture and in general appearance, in fact they were so poor in these respects that it was practically impossible to make any comparison with the other breads. The results indicate that the injurious effects of the carbon bisulphide were leaving the flour, as there was improvement in the quality of the loaf of the second and third bakings. The flour worked normally in the mixing and during first rising, but was lifeless in the later stages, and would not spring in the oven. The sulphur treated flour also improved somewhat, but at the end of four and a half months it was still an unsaleable flour for breadmaking purposes. As it was evident that the hydrocyanic acid had not injuriously affected the flour, it was decided not to include this flour in further tests In the case of the soft winter wheat flour the treatment with sulphur and carbon bisulphide was even more injurious, while hydrocyanic acid had no injurious results.

To further study the effects of the various fumigants upon the flour, we determined total protein, gliadin, or alcohol soluble proteids, and water soluble proteids. The results are as follows:—

TABLE III.

——	Total Proteins.	Gliadin or alcohol Soluble Proteins.	Water Soluble Proteins.
85% Manitoba Hard Flour:	%	%	%
Normal flour	12.0101	6.5762	1.7123
Sulphur treated flour	11.9677	6.7277	2.7871
Carbon bisulphide treated flour	12.0348	6.4949	1.7860
Hydrocyanic acid gas treated flour	12.0086	6.5612	1.6665
Straight Grade Soft Flour:			
Normal flour	9.0893	4.6624	1.5314
Sulphur treated flour	8.9645	5.2156	4.4544
Carbon bi-sulphide treated flour	9.0499	4.7215	1.6409
Hydrocyanic acid gas treated flour	8.9957	4.9112	1.5096

From the above figures it is evident that the hydrocyanic acid and carbon bisulphide treatment did not materially affect the proportionate quantity of the protein soluble in alcohol, or water, but in both the hard and soft flour the sulphur treatment did increase the amount of water soluble protein very materially. This is especially true of the soft flour and doubtless accounts for the soft, sticky gluten and the very poor results got in our baking trials with soft flours. The water soluble proteids were also increased slightly by the carbon bisulphide treatment, both in the hard and soft flour, but more particularly in the latter.

We also studied the effect of the fumigants on the bacteriological life of the flour, but found practically no reduction in the germ life of the hydrocyanic treated flour, a slight reduction with the carbon bisulphide, and a great reduction in the sulphur treated flour.

The acidity of the flours was also influenced, more particularly, as would be expected, by the sulphur fumes, and possibly it is this factor, together with its effects on the gluten, which most seriously injures the sulphur treated flour.

From the above results, it is very evident that the carbon bisulphide would be very much more injurious to flour than hydrocyanic acid. The results were

not continued long enough to ascertain how long the carbon bisulphide treated flour would be in getting back to normal condition, but the experiment was discontinued because it was felt that if flour would not become normal in four or five months from time of treatment it would practically be as fatal to the miller as if it never would regain its original condition.

The carbon bisulphide is very effective in destroying insect life, but it is evident that if this material is to be used as a fumigant, all wheat or flour must be removed from the mill before the fumigation is done.

Another point that is very frequently overlooked in the fumigation of mills is that, while the old and young insects are destroyed by the gaseous carbon bisulphide and hydrocyanic acid, the eggs are not, and that they develop in due time and only require time to multiply to thoroughly infest the whole mill again. To catch the brood of insects hatched from the eggs present in the mill at the time of fumigation a second fumigation ought to be given about ten days or two weeks after the first treatment. In this way a thorough cleaning out of the mill may be accomplished. Without the second treatment the number of insect pests will be greatly reduced, but they will not be eradicated, because the eggs have been left and a new brood develops. It is quite probable that in many cases this has been the cause of unsatisfactory results reported from fumigating.

Too much stress cannot be placed on the fact that both of these gases are poisonous, and that every precaution must be taken against inhaling any of the vapors.

Another material for fumigating flour mills, known as fumoth, has recently been brought to our attention. The first sample we examined was a liquid, while the second was in the form of rolls of paper which apparently had been soaked in the liquid substance. The first sample required to be heated to volatilize the active principle of the material, whereas, the paper rolls only required to be set on fire and the fumigating material was volatilized. In the latter form, this substance is very convenient, as it can be used in individual spouts, or in different machines, with very little trouble.

A chemical analysis of the material shows that it contains nicotine and other forms of alkaloids. We had no chance to determine its efficiency in destroying insects in the mill, but we were unable to find that it did any injury to the flour. The strong smell of burning tobacco noticeable on the flour did not quickly disappear and was evident in the bread made from heavily treated flour, even three weeks after treatment. Otherwise the bread was in every respect equal to that made from the untreated flour.

A Study of the Effect of Bleaching on the Quality of Flour.

During the last few years, a great deal of experimental and investigation work has been undertaken to determine what effect bleaching has on the quality of flour. It is still a live question with our millers and bakers, and perhaps it will not be out of place to give the results of our work. Naturally, the points to be settled are; first, are there any deleterious materials left in the bread, biscuits, or other substances prepared from the flour? Second, is the quality of the flour improved as a result of the treatment?

At the present time, practically all the bleaching of flour done in this country is either by the Alsop electrical process or by chemical process, both of which make use of the Andrews process or method patent. Our study of the subject was made

almost entirely with the former method, although we have baked a number of samples of flour that were treated by the old process. We have not gone very deeply into the study of the nature of the materials left in the flour, because this point has been very fully studied by Wesener and Teller, of the Columbus Laboratories, Chicago; Snyder, of Minnesota; Ladd, of North Dakota, and many others. What work we have done fully confirms the results published by these investigators, namely, that oxides of nitrogen are formed as a result of drawing air through the electric spark, and that these oxides when passed over flour bleach it, or make it lighter in color; also that the nitrites formed in the flour are easily detected.

It is well known that there are small quantities of the oxides of nitrogen in the atmosphere, and that when flour is exposed to light and air it becomes whiter. This whitening of the flour is one of the results of "ageing," and, from all that is known about the matter, appears to be due to the action of the oxides of nitrogen on the coloring matter chiefly present in the fat or oil of the flour. In the artificial bleaching, the action is apparently hastened by a larger proportion of this gas in the air passed over the flour.

There is no doubt about the fact that the oxides of nitrogen are very poisonous, and the main argument against their use is based upon the assumption that a sufficiently large quantity is left in the flour to be harmful. In answer to this, I can only state that in our work, while we could easily get the nitrite reaction in the flour, we were never able to get it in the bread, and in this respect our results confirm those reported by earlier investigators. Apparently the nitrite nitrogen is either oxidized to the nitrate condition, or it is volatilized. As to whether other harmful products are formed, I may say we have no evidence; but when we take into consideration that heavy bleaching is not desirable from the millers' standpoint, the tendency to overload the flour with nitrites is very much reduced, and danger from this source minimized, or is more nearly on a par with normally "aged" flour.

The points we more particularly studied were: First, does bleaching improve the water absorption of the flour, and the volume, color and texture of the bread? Second, is there much danger of over-bleaching? Third, does the bleaching shorten the commercial life of the flour? And fourth, does the bread made from bleached flour dry out more quickly than that from the unbleached article?

Every one who is familiar with the working of flour knows that freshly milled flour, especially from new wheat, does not give as good results in the baker's hands as flour that has been kept for some time, or, in other words, flour improves with age; it will absorb more water, the color is better, the texture of the bread is more silky and the general appearance of the loaf improved. If bleaching is a process of artificially "ageing," then similar results should be looked for, and, naturally, the most pronounced results will be obtained from freshly milled flour, and especially with the fresh flour from a new crop of wheat.

To illustrate the results we obtained, I quote from many similar experiments: On November 1st, 1909, we secured a sample of long patent Manitoba wheat flour which had been milled from new wheat the day before, immediately bleached a portion of it, and then made a baking from the bleached and unbleached portions. Again, in February, we secured similar samples and treated them the same as the above. The bakings were made in the same manner as all our comparative work, 340 grams of flour being used for each loaf of bread. The weight of the loaf is given in grams, and the volume in cubic centimetres. The color, texture and appearance of the bread is given in percentage of the loaf taken as

standard, and in this case the bread from the bleached flour is compared with the unbleached, which is taken as the standard. The results of these tests are as follows:

	New Wheat.		Old Wheat.	
	Unbleached.	Bleached.	Unbleached.	Bleached.
Wet gluten	38.4	38.1	36.9	36.7
Absorption	65.2	65.0	68.1	68.1
Weight of bread, grams	511	503	517	521
Volume of loaf, c.c.	2,680	2,730	2,830	2,830
Color of bread	100	104	100	101
Texture of bread	100	101	100	100
Appearance of loaf	100	103	100	100

These two sets of samples of flour were not out of the same lot of wheat. The point I want to make is that there is a greater improvement in the color, texture and the well-rounded appearance of the loaf from the bleached flour from the new wheat than in that from the old wheat. It may also be pointed out that there is no improvement in either case in the water absorptive power of the flour and very little in the size of the loaf.

The effect of the bleaching on the different grades of flour was somewhat fully studied. The following results are given as characteristic of many bakings made. In every case the freshly milled flour was divided into two parts; one was bleached and the other left as it was, and then both lots were baked and the comparison made.

Name.	Gluten.	Absorption.	Yield.	Volume.	Color.	Texture.	Appearance.
Unbleached Short Patent	36.80	67.6	507	2,650	100.0	100.0	100.0
Bleached Short Patent	37.00	67.5	504	2,810	102.0	102.0	104.0
Unbleached Bakers	38.37	67.3	502	2,790	100.0	100.0	100.0
Bleached Bakers	37.78	65.8	496	2,830	102.0	102.0	100.5
Unbleached Man. Str. Grade	38.40	65.3	511	2,680	100.0	100.0	100 0
Bleached Man. Str. Grade	38.07	64.7	503	2,730	104.0	101.1	103.0
Unbleached Low Grade	38.57	72.3	520	2,450	100.0	100.0	100.0
Bleached Low Grade	37.77	71.7	523	2,400	100.0	100.0	100.0

As the figures indicate, the bleached patent and bakers' grades of flour made a bread of whiter color and better texture than the unbleached flours of the same lots. The loaves, also, had a bolder, better appearance, something of the difference that is seen between freshly milled flour and the same flour "aged." This difference was more pronounced in the bread made from the patent than in that from the bakers' grade. In the case of the straight grade, the bleaching made some improvement, but it was not so decided as with the patent and bakers' grades, while bleaching the low grade was without results, unless it was to bring out the bran particles more distinctly.

Apparently the gas bleaches the coloring matter in the fats, but does not affect the bran. It is true that there is more fat in the low grade than in the high patents, but there is so much ground up bran present that the whitening

only tends to show up these particles more distinctly. However, so long as there is so much emphasis placed on whiteness of bread it would appear as though anything which can be done to whiten or bleach the long patents or bakers' grade of flour ought to be an advantage, for these flours contain more protein and fat than the short patent, and, consequently, ought to be more nutritious. This point is illustrated by the following figures taken from Bulletin No. 13, part 9, of the Bureau of Chemistry, Department of Agriculture, Washington:

	Moisture.	Fat.	Carbohydrates.	Fiber.	Ash.	Proteids	Gluten. Wet.	Gluten. Dry.
Wheat	9.07	2.74	70.37	1.68	1.79	14.35	32.31	11.88
Patent	11.48	1.45	73.55	.18	.39	12.95	36.14	10.85
Bakers	12.18	2.00	69.99	.33	,62	14.88	51.21	16.97
Low Grade	12.01	3.86	63.26	.93	1.99	17.95	10.01	4.26

Of course the low grade flour given above is out of the question for commercial bread making at least, for it cannot be made into a saleable loaf of white bread. The bakers' grade might be made almost equal in color to the patent by bleaching, but, in our experience, it cannot be made into as nice a texture bread as the short patent. In this connection, the question naturally arises, Can the miller, by bleaching, increase the length of the patent? From our experience it would appear as though he could, but always with a decrease in the silkiness of the texture of the bread. The lengthening of the patent would mean selling more of the flour in the highest and most expensive grade. On the other hand, there is no specified proportion of the flour put in the highest grade; that is a matter for each miller to decide and is influenced by the quality of the wheat.

With reference to the size of the loaf, the bleached flour always gave a slightly larger loaf, excepting in the case of the low grade flour. The difference was not very great, but it was invariably in the same direction and always enough to be easily detected with the eye and confirmed by the measurement. On the other points, the bleaching did not have any influence, unless it was to very slightly decrease the water absorption.

Prof. Snyder, of Minnesota, claims that bleaching decreases the moisture content of the flour, but gives no figures to prove the point. We took several samples of flour and divided them into two parts, and after bleaching one portion immediately determined the moisture in the bleached and unbleached samples. The results of these moisture demonstrations are as follows:

	Unbleached.	Bleached.
First patent	11.04	11.01
First patent	10.89	11.02
First patent	11.01	11.09
First patent	12.41	12.53
Bakers'	12.57	12.43

The above results show that there is little or no difference in the moisture content of the unbleached and bleached samples of flour. It would hardly appear possible for the bleaching process to affect the moisture content of the flour, as it is only exposed to the gas for a fraction of a minute.

It has been stated that the bleached flour contained less water than the corresponding samples of unbleached flour after they had been stored under similar conditions for a month after being bleached. We did not investigate this point, but in all our baking tests we had no indication that the comparative water absorptive power of the flour was changed in any way when stored under similar conditions. We have a great many results on this point, but I shall only quote the figures obtained from one set each of the patent, bakers' and an 85 per cent., which were characteristic of all the work. The flours were stored in tin cans and kept side by side on a shelf in the flour testing room. At intervals the flours were rebaked and the bread carefully scored. It would be too cumbersome to quote the results of all these tests, but the scores of the first and last bakings of each set of samples are given in the following table:

FIRST BAKING, OCT. 20, 1909.

	Unbleached.	Bleached.
SHORT PATENT.		
Gluten wet	36.40	36.43
Absorption	65.3	64.7
Weight of bread, grammes	500.	486.
Volume of loaf, cubic centimetres	2,830.	2,800.
Color of bread	100.	101.
Texture of bread	100.	99.
Appearance of loaf	100.	100.
BAKERS'.		
Gluten, wet	38.87	37.80
Absorption	67.1	65.9
Weight of bread, grammes	502.	496.
Volume of loaf, cubic centimetres	2,790.	2,830.
Color of bread	100.	102.
Texture of bread	100.	102.
Appearance of loaf	100.	100.5
85 PER CENT. PATENT.		
Gluten, wet	38.40	37.90
Absorption	66.5	66.0
Weight of bread, grammes	499.	494.
Volume of loaf, cubic centimetres	2,670.	2,860.
Color of bread	100.	102.
Texture of bread	100.	102.
Appearance of loaf	100.	101.

LAST BAKING, MAY 30, 1910.

	Unbleached.	Bleached.
SHORT PATENT.		
Gluten, wet	36.40	35.46
Absorption	71.2	69.4
Weight of bread, grammes	529.	513.
Volume of loaf, cubic centimetres	2,860.	2,900.
Color of bread	100.	101.
Texture of bread	100.	100.
Appearance of loaf	100.	100.
BAKERS'.		
Gluten, wet	38.87	37.80
Absorption	71.8	70.6
Weight of bread, grammes	519.	515.
Volume of loaf, cubic centimetres	2,840.	2,900.
Color of bread	100.	101.5
Texture of bread	100.	100.
Appearance of loaf	100.	100.

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85 PER CENT. PATENT.	Unbleached.	Bleached.
Gluten, wet	38.40	38.07
Absorption	71.2	70.3
Weight of bread, grammes	530.	518.
Volume of loaf, cubic centimetres	2,770.	2,850.
Color of bread	100.	101.
Texture of bread	100.	101.
Appearance of loaf	100.	100.

It will be noticed that the per cent. water absorption increases in all the flours throughout the seven months that the test lasted, but that the unbleached flour always kept slightly in the lead.

Another point of special value is well illustrated in the above figures, namely, that the bleached flour has not fallen off in quality as a result of keeping through the seven months. We have a number of tests of flour kept for shorter periods, and in no case is there any evidence of the bleached flour falling away in quality faster than the unbleached article. We still have some of these flours on hand, and shall continue testing them, but I presume that for commercial purposes this is as long as the experiment need be continued.

It has been claimed by some bakers that the bread from bleached flour dries out more quickly than that from the unbleached article. To gather some data on this point, we baked freshly bleached and unbleached patent, bakers' and 85 per cent. grades of flour, and kept the bread for one week, weighing the loaves daily. We also gave some of each of the flours to a commercial baker, who baked two large loaves from each flour. These loaves were also kept for one week and weighed daily to obtain loss in weight. The following table gives the per cent. of the first weight of bread retained at the end of seven days:

COLLEGE BREAD.	Unbleached.	Bleached.
Patent	91.0	91.8
Bakers' grade	90.9	90.7
85 per cent. patent	88.00	88.8
BAKERS' BREAD.		
Patent	91.4	91.0
Bakers' grade	90.0	91.1
85 per cent. patent	90.1	91.3

It is evident from the above figures that there is little difference in the rate of drying of the bread from the unbleached and bleached flour. In fact, the slight variation is apparently in favor of the latter flour, but the difference is so small that it is almost within the limit of error in the work. It may also be stated that there was no difference that we could detect in the apparent dryness of the bread.

There is one other point to be dealt with, and that is as to whether flour is injured by heavy bleaching. In investigating this point we treated different grades of flour for different periods of time and then baked them by our regular comparative method. The bleaching was done with a comparatively light run of gas and in a hand agitator made after the same principle as those in use in

the flour mills. We divided the flour to be worked with into the necessary number of samples and then treated them for periods of time, varying from 30 to 90 seconds. I quote the results obtained from a sample of 85 per cent. patent baked on January 10th, and milled and bleached a day or two previously:

Name.	Gluten.	Absorption.	Yield.	Volume.	Color.	Texture	Appearance.
85% Man.—normal	38.57	67.6	513	2,800	100.0	100.0	100.0
85% Man.—*30 sec.	.....	67.6	503	2,800	102.0	100.0	100.0
85% Man.—*40 sec.	.....	67.6	504	2,900	102.0	100.5	101.0
85% Man.—*50 sec.	.....	67.1	505	2,880	102.0	100.5	100.0
85% Man.—*60 sec.	.....	66.5	496	2,700	101.0	99.0	99.0
85% Man.—*90 sec.	.....	66.5	496	2,700	101.0	98.0	98.0

*Bleached.

The results are practically the same as we got from many other experiments. They show a slight improvement up to the 40 seconds' treatment and a falling off in quality on longer exposure. I do not mean by this, that a miller can safely treat his flour for a period of 40 seconds, as the flow of gas he is using may be stronger, but I do think that there is nothing to be gained, and possibly much to lose, by prolonging the treatment longer than is necessary to bleach the color as much as may be desired.

In conclusion, I may say that the results of our experiments lead us to believe that bleaching flour with the oxides of nitrogen produced by the electrical method whitens the flour and slightly improves the texture and appearance of the loaf. This difference is more pronounced with the flour from new wheat than with that from older wheat. The color obtained as a result of the treatment with the gas is whiter, but to many people it is not so desirable as the creamy tint of the normally aged flour. There does not appear to be much difference in the water absorption; in fact, in all our work we get rather lower absorption. The volume of the loaf is slightly increased, and, naturally, as the bleaching is a process of ageing, the increase in volume is most noticeable in the flour from new wheat. To sum up, it would appear that bleaching has some of the effect of time in improving flour, but does not give the full results of "ageing" produced by time.

Dairy Products.

Milk is one of the most nutritious, and, contrary to the general opinion, one of the cheapest of the materials used as food. It contains all the constituents required for the development of the body in well balanced proportions, and it is easily digested. It is always a matter of regret that so large a percentage of this valuable material is lost in making butter and cheese. In making butter, very little but the fat of the milk is used; all the protein and sugar and ash remains. If these milk solids could be put up in a solid form cheaply without decreasing their digestibility or flavor, a very valuable food would be added to those now available for human consumption. Under present conditions, nearly all of this material goes back to the farm to feed the stock. In making cheese a larger proportion of the solids are used, but still nearly half of them are lost in the whey. It is true that the part lost is not the most valuable, but still a large amount of excellent food material is left in the whey, which, because of the ease with which it ferments, is only partly recovered as a hog feed.

Recently the demand for casein in the sizing of paper has led a few of our butter factories to prepare a commercial casein product from skimmed milk. The casein is usually separated by adding one pint of strong sulphuric acid to 1,000 pounds of the milk. This coagulates the casein and it is separated from the whey, dried, ground and put on the market as a powder. The whey is naturally very acid and some doubt has been expressed as to the advisibility of feeding a material that contains so much free sulphuric acid. A little work we have done on this subject indicates that the acidity of the whey decreased in the whey tank, possibly due to combination of the acid with materials of the whey. We have determined the acidity of the material, but we cannot say whether the amount is harmful or not. The acid condition, can, however, be easily overcome by the addition of lime, forming the harmless calcium sulphate. It will be necessary to continue this work and to carry out some feeding experiments to ascertain the effect of the whey on the hogs.

Regarding its nutritive value, we may say that samples we have analysed carry about .25 per cent. of fat and .35 to .40 per cent of protein. Ordinary whey from cheese contains about .25 to .30 per cent. of fat, and approximately .80 per cent. of protein. As the two products will be about alike in sugar and ash, it is evident that the cheese whey is the better feed.

Losses in Making Cheese from Over-ripe Milk.

Last year we reported the results of the study of the loss of protein and fat in making cheese from over-ripe milk under average factory conditions. The results were not conclusive and the work was taken up again this past season in co-operation with the Dairy Department and in such a way that it was possible to secure accurate weights of milk, whey and cheese. The amount of protein and fat in milk, whey and cheese was determined to ascertain the distribution of these constituents in the cheese made from normal and over-ripe milk. The moisture in the cheese was also determined. In this year's work small vats (700 pounds) of milk were used, whereas last year's experiments were carried out in the regular factory vat of 5,000 to 6,000 pounds of milk. Naturally, in dealing with the smaller amount of milk it was possible to weigh the milk more accurately, and, also, to control the conditions after dipping better than with a large vat under average factory conditions. It is not surprising, therefore, that we found the losses smaller in this year's work than last. The results of the two seasons' investigations may be briefly summarized as follows:

The Average Losses of Protein, Fat and Moisture and the Weight of Cheese Recovered per 100 pounds of Milk.

		Protein.	Fat.	Moisture.	Cheese.
(1)	1909.	lbs.	lbs.	lbs.	lbs.
	Normal milk	.735	.338	.....	9.17
	Over-ripe milk	.778	.337	.....	8.31
		.043	.....	.....	.86
(2)	1910.				
	Normal milk	.803	.529	3.11	9.04
	Over-ripe milk	.832	.664	2.92	8.79
		.029	.035	.19	.25

It will be noticed that moisture was determined in the cheese made in 1910, and that we found on the average 19 per cent. less moisture in the cheese made from over-ripe milk than in that made from normal milk. The amount of protein and fat lost was not very large.

The amount of protein lost is apparently dependent upon the amount of acid present and the length of time it is allowed to act in the curd. The following experiment illustrates the point. Two different lots of milk were brought to ordinary temperature for coagulation and then divided into several portions and coagulated. After the curd was firm and ready to cut some of the whey was drawn off from one portion, after ten minutes whey was drawn from a second portion, and after the expiration of another ten minutes whey was drawn from a third portion. Then the amount of protein was determined in these separate portions. The following results show the increase of acidity and the amount of protein dissolved by the acid in ten-minute periods:

1st lot—	.17	per cent.	acid	in whey	gave	.937	per cent.	soluble protein.
	.175	"	"	"		.947	"	" "
2nd lot—	.23	"	"	"		1.072	"	" "
	.25	"	"	"		1.118	"	" "
	.27	"	"	"		1.126	"	" "

Our investigation leads us to believe that the losses in making cheese from over-ripe milk are dependent upon the amount of acid, the length of time it is left in the acid, the care exercised in handling the curd, and in the dryness of the cheese as influenced by the acidity of the curd.

Lime-Sulphur Wash.

Effect of adding Lime.—Many of those who use the clear concentrated lime-sulphur wash for spraying find it advantageous to use some lime along with it. The main need of the lime is to mark the trees so that the thoroughness of the spraying can be controlled; but it has other uses besides: (1) It does not allow so much waste; i.e., the wash does not drip so much; (2) Lime possesses insecticidal and fungicidal value; and (3) some claim that it improves the sticking qualities of the wash and increases the length of time that the latter is active on the tree.

A point to be considered, however, in using lime with the wash is that concerning the effect which it may have upon the strength of the latter. The strength of the wash is dependent upon the amount of the polysulphides of calcium (or lime) which are present in solution and also upon the nature of these polysulphides. There are three polysulphides—tri-sulphide (CaS_3), tetra-sulphide (CaS_4), and penta-sulphide (CaS_5)—the one richest in sulphur (CaS_5), being the most valuable of the three. The value of the other two is in the order of their sulphur content. It follows, then, that the wash which has the greatest quantity of the higher polysulphides will be the best; and that the addition of any subtance to a wash which would tend to break higher polysulphides down into lower polysulphides would be objectionable. Will the addition of lime cause this breaking down?

EFFECT WHICH THE ADDITION OF LIME HAS UPON THE COMPOSITION OF THE LIME-SULPHUR WASH.

No.	Dilution.	Treatment.	Kind of Lime.	Total Sulphur. Lbs. per gal. of original Concentrate.	Sulphide Sulphur. Lbs. per gal. of original Concentrate.	Sulphur in other forms. Lbs. per gal. of original Concentrate.	(A) Lime (CaO.) Lbs. per gal. of original Concentrate.	(B) Lime (CaO.) Lbs. per gal. of original Concentrate after subtracting the amt. capable of being held by the water of the spray and other sulphur.	Ratio between Lime (B) and Sulphide Sulphur.
1	....	Check	.....	3.4220	3.2380	.1840	1.621	1.461	1 : 2.21
2	1-9	Fresh slaked lime.....	Beachville .	3.2216	3.0160	.2056	1.818	1.504	1 : 2.00
3	1-8	"	"	3.2637	3.0110	.2527	1.823	1.482	1 : 2.03
4	1-17	"	"	3.1963	3.1123	.0840	1.994	1.678	1 : 1.85
5	1-17	"	"	3.1723	3.0405	.1318	2.154	1.798	1 : 1.70
6	1-44	"	"	3.2769	3.0249	.2520	2.819	1.996	1 : 1.51
7	1-44	"	"	3.2535	3.1311	.1224	2.405	1.701	1 : 1.84
8	1-89	"	"	3.2733	3.1167	.1566	3.197	1.853	1 : 1.68
9	....	Check	.....	3.4293	3.2940	.1353	1.654	1.536	1 : 2.14
10	1-8	Air-slaked lime.....	Beachville..	3.3163	3.1932	.1231	1.924	1.695	1 : 1.88
11	1-17	"	"	3.3444	3.2897	.0547	2.116	1.705	1 : 1.93
12	1-44	"	"	3.3354	3.2796	.0558	2.387	1.730	1 : 1.89

In the above table the effect of both fresh-slaked and air-slaked lime upon the composition of the wash at different dilutions is shown. Four pounds of quick lime or 6 pounds of slaked lime were used in 40 gallons of spray. Without discussing the method of figuring, * suffice it to say that there appears to be a slight breaking down of the more valuable polysulphides into the less valuable ones; but the extent of this does not seem great enough to warrant the condemnation of the practice of adding lime to the wash. Air-slaked lime does not decompose the wash quite so much as the fresh-slaked lime, but the latter is more suitable since it is not so granular, and thus it does not settle so rapidly to the bottom of the spray tank.

Effect of Adding Arsenicals.—On page 31 of Bulletin 177 an experiment is given showing the effect which the addition of three well known arsenicals—lead arsenate, Paris green, and calcium arsenite—has upon the composition of the

* It is assumed here that 100 parts of the Lime-Sulphur wash at the various dilutions tried will hold in solution about the same amount of lime (CaO) as will pure water, viz., 0.13 pts from $Ca(OH)_2$ and about the same from $CaCO_3$ (air slaked). It is also assumed that the "sulphur in other forms" exists as calcium thiosulphate, CaS_2O_3. From this standpoint the amounts of lime given in the next to the last column were calculated, and since this is the lime which is in combination with the sulphide sulphur, we can thus figure the ratio between the lime and sulphur which go to make up the sulphides, and from such data arrive at what sulphide predominates in the wash.

If we take the five sulphides of calcium which possibly exist, we find the following ratio between lime and sulphur present in them:

CaS_5	1	CaO	:	2.85 S.
CaS_4	1	"	:	2.28 "
CaS_3	1	"	:	1.71 "
CaS_2	1	"	:	1.14 "
CaS	1	"	:	0.57 "

Comparing these figures with those in the last column of the table, it will be seen that the checks apparently are largely made up of the polysulphide CaS_4. When lime is added, either fresh-slaked or air-slaked, there seems to be a tendency for this sulphide to partially break down into lower forms, mainly to CaS_3. This, however is only partial in most instances, although in one or two cases, samples 6 and 8. there seems to be a decomposition slightly past the CaS_3 stage and on into CaS_2.

lime sulphur wash. It was there shown that Paris green decomposes the wash seriously and could not be used in connection with it, but that lead arsenate and calcium arsenite did not cause any serious decomposition and could be used with the wash, provded no foliage injury should result from the combination.

In the following table it will be seen that the results correspond with those previously published. Paris green reduces the strength of the wash nearly 50 per cent., whereas the reduction caused by the other two is not sufficiently great that their use could be condemned. Lead arsenate does not affect the strength of the wash quite so much as calcium arsenite, but it is much more expensive, and a choice between the two will depend upon which will be the safer to apply to foliage. This last question is gradually being worked out by orchard experiments and reports on such work will be found elsewhere.

EFFECT WHICH THE ADDITION OF ARSENICALS HAS UPON THE COMPOSITION OF THE LIME-SULPHUR WASH.

No.	Dilution.	Treatment.		Total sulphur.	Sulphide sulphur.	Other sulphur.	Lime (CaO)
		Arsenical.	Amount.	Lbs. per gal.	Lbs. per gal.	Lbs. per gal.	Lbs. per gal.
1	1-44	.....	.....	3.2930	3.1690	.1240	1.706
2	"	Lead arsenate.	4 lbs. per 40 gals.....	3.1025	2.9245	.1780	1.556
3	"	Paris green...	1 lb. per 40 gals.....	2.8785	1.6240	1.2545	1.7960
4	"	"	"	2.8065	2.0335	.7730	1.636
5	"	Calcium arsenite	½ lb. white arsenic per 40 gals.....	2.9690	2.7830	.1860	1.886

Note.—The weights given are for the original concentrate.

THE MANURIAL CONSTITUENTS TAKEN FROM THE SOIL BY AN AVERAGE CROP OF CAULIFLOWER.

Last spring, Mr. J. F. Harries wrote his graduation thesis on the above topic. He did considerable analytical work to procure the required data and the results of his analyses and conclusions we see fit to incorporate in this report.

The methods used were those of the Association of Official Agricultural Chemists. In the following table is given the percentage of total ash, lime, phosphoric acid, potash and nitrogen found in the heads, leaves, and root, the latter including the stalk.

Constituent.	Heads.	Leaves.	Root and Stalk.
	%	%	%
Total ash	.72	1.63	.73
Lime (CaO)	.067	.402	.281
Phosphoric acid (P_2O_5)	.102	.105	.151
Potash (K_2O)	.245	.225	.464
Nitrogen (N)	.340	.365	.359

As regards distribution of the ash constituents, lime is found largely in the leaves, root and stalk, a small amount being in the head. Phosphoric acid is quite evenly distributed in the heads and leaves, but nearly half as much again in the root and stalk. The same statement applies to potash, except that twice as much

is found in the root and stalk. Nitrogen is equally distributed throughout. The smallest percentage of ash is found in the head.

From the foregoing table was calculated the following table, giving the pounds of fertilizing ingredients taken from the soil per acre of cauliflower grown. The basis for the calculation was as follows: Allowing 7,000 plants per acre as an average crop and that 6,000 of these were harvested, producing 5 tons of heads, and that the refuse would consist of leaves, 17,500 pounds, and stalks and roots, 5,250 pounds.

—	Heads.	Leaves.	Roots.	Total.
	Lbs.	Lbs.	Lbs.	Lbs.
Phosphoric acid (P_2O_5)	10.2	18.4	7.9	36.5
Potash (K_2O)	24.5	39.4	24.4	88.3
Nitrogen (N)	33.9	63.8	18.8	116.5
Lime (CaO)	6.7	70.4	17.2	94.3

From this table we find that out of 36.5 pounds of phosphoric acid only 10.2 are removed from the soil, provided, of course, that only the heads are utilized, as is true in growing cauliflower commercially. This amounts to 28 per cent. of the total phosphoric acid. Of 88.3 pounds of total potash 24.5 are removed, or 27.7 per cent. of the total. As regards lime, out of 94.3 pounds, 6.7 are removed or 7.1 per cent. of the total amount; and 33.9 pounds of nitrogen are removed out of a total of 116.5 pounds, or a percentage of 29 of total.

We conclude with a table giving comparison figures with other crops. The figures used are those of Cyril G. Hopkins in "Soil Fertility and Permanent Agriculture," page 154, table 23.

Crop.	Yield.	Phosphoric acid.	Potash.	Nitrogen.
		(P_2O_5)	(K_2O)	(N)
Oat crop	100 Bush.	36.6	81.6	97.
Straw	2½ Tons.			
Wheat crop	50 Bush.	36.6	69.6	96.
Straw	2½ Tons.			
Alfalfa crop	8 Tons.	82.4	230.4	400.
Potatoes	300 Bush.	29.7	108.	63.
Sugar Beets	20 Tons.	41.2	188.4	100.
Apples, Fruit	600 Bush.	16.0	74.4	53.
Wood, Growth	1 50 Tree.			
Cauliflower, heads only	5 Tons.	10.2	24.5	33.9
Total		36.5	88.3	116 5

In conclusion, we would say that the amount of fertilizing constituents removed by cauliflower is very much lower than that of the other crops given. This is due partly to the fact that the yields of the other crops cited are very much above the average, except in the case of sugar beets. This would no doubt make a considerable difference to the table, but even then cauliflower could be classed with the lightest feeders. Moreover, it must be remembered that only the immature blossom is used, and if all the waste material is returned to the soil the draught on the soil must necessarily be light.

Respectfully submitted,

R. HARCOURT.

PART VII.

THE PROFESSOR OF VETERINARY SCIENCE.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit my report for the year 1909-1910.

CLASS ROOM.

First Year.—To this Class I gave a course of lectures on Veterinary Anatomy, briefly though somewhat comprehensively, considering the anatomy of the horse and the ox. When possible, we verified description by the examination of the skeleton of the horse or the living animal. During the afternoon lectures we discussed the erection of horse stables, as regards site, drainage, material, ventilation, kinds and arrangement of stalls, both box and single, floors, mangers, feed boxes, etc.; also the general care of horses as regards feeding, watering, grooming, etc.; and the care of harness, saddles, vehicles, etc. This was followed by a course of demonstrations in scoring and judging horses of the different breeds and classes.

During the winter term I gave a course of lectures on "Veterinary Materia Medica," in which we discussed properties, actions, uses and doses of the different drugs used for the prevention and cure of the ordinary diseases of farm stock. We also discussed the different forms in which medicines are given, and the different modes of administration, with the advantages and disadvantages of each.

Second Year.—The class room work for this year during the fall term consisted in a consideration of the causes, symptoms and treatment of the ordinary diseases of domesticated animals, with frequent reference to the proper way of feeding, watering, and general care of stock in order to prevent disease. As far as possible we illustrate the point under discussion by the examination of a living horse, the skeleton, or a bone.

During the winter term I gave to this class a course of lectures on "Veterinary Obstetrics," treating of the phenomena of conception, gestation, and parturition; the various causes of sterility and the means by which some of them can be overcome; the diseases of both sexes due to the act of reproduction; the general hygienic treatment of pregnant females; the causes of difficult parturition, with the means for their removal; the causes, symptoms and treatment for the diseases of both dam and offspring incident to and following parturition, until the latter has reached that age at which he can exist independent of the former. We pay special attention to the diseases of the young.

During the afternoons I gave a course of lectures and demonstrations on the practical methods of handling horses and colts; securing animals for minor operations and the performance of the same, as dissecting out tumors, lancing abscesses, dressing and stitching wounds, checking hemorrhages, castrating, dressing teeth, applying blisters, bandages, etc. We illustrated the application of bandages, stitching of wounds, the different methods of administering medicines, passing a probang in an ox, puncturing an ox in case of excessive bloating, etc. I also gave this class a course in Horse Judging, using for the purpose the horses of the institution, those of my own stable, borrowing some, and visiting neighboring studs.

Third and Fourth Years.—With these years I continued the course in Horse Judging, using our own horses, those of local studs, and visiting various studs at considerable distance.

Special Dairy Class.—To this class I gave a short course of lectures on the causes, symptoms and treatment (both preventive and curative) of the ordinary diseases to which dairy stock is subject.

Short Course in Stock Judging.—This course, which was held in January, was well attended, and those who attended expressed themselves as being well satisfied. We gave a practical course of scoring and judging horses of the different breeds and classes. In this work I was ably assisted by J. M. Gardhouse, Esq., of Weston, Ont. We have for this class a fair number of reasonably good draught horses and three pure-bred Clydesdale mares, but are dependent upon local owners, dealers, importers and breeders for horses to represent all other breeds and classes, and I wish to take this opportunity of publicly thanking the following gentlemen who kindly sent their grooms with their horses to fill the different classes, viz., Messrs. Sorby, McCannell, Hales, McMaster, Ryan, Stewart, Hurley, Palmer Bros., Baker Bros., and Dr. Harvey.

Injuries and Diseases of Stock.—In the different classes of stock we had cases of the ordinary diseases. We lost a colt a few weeks old from septic infection following castration. We lost a shorthorn heifer from fardel-bound and had one fatal case of metritis in a cow.

I have, Sir, the honour to be,

Your obedient servant,

J. H. REED.

PART VIII.

THE PROFESSOR OF DAIRY HUSBANDRY.

To the President of the Ontario Agricultural College:

SIR,—I beg leave to submit my twentieth annual report of the Dairy department of the College. This report contains a summary of the Creamery operations as submitted by Mr. Stratton, and also a digest of the experimental and investigational work done during the year. There is not much change from year to year in the amount, or methods of teaching, hence these need not be dwelt upon in detail. In addition to the regular work of teaching scientific and practical dairying to the College students proper, we have had two short courses during the year—one for three months, especially intended for cheese and butter makers and farmers; and one for a week for the benefit of the Instructors who are employed during the summer season visiting creameries and cheeseries. During the three months' course special instruction was given in Soft and Fancy Cheesemaking to those who desired such help. About twenty-five students from the Macdonald Institute took instruction in the farm dairy and in Soft Cheesemaking during the three months' course, and a few also in the spring term. Altogether about ninety students took special work in the short courses for dairying.

CHANGES IN THE DAIRY STAFF.

Early in the year Mr. C. H. Ralph, Demonstrator in Cheesemaking, who has given faithful service to the Dairy department of the College for a number of years, resigned to accept a more lucrative commercial position in the United States. Mr. M. Robertson, of the Dairy School Staff, has done likewise. Mr. Geo. Taylor, Demonstrator in Milk and Cream Testing, is leaving at the end of the present calendar year to engage in commercial work. Mr. R. W. Stratton also intends leaving after the Dairy School Term of 1911. All of these men have given years of excellent service to the Dairy department of the College, and we are sorry to lose them. Mr. Stratton has been with us since 1895. No man could have given more of his time and efforts for the advancement of dairy knowledge than has Mr. Stratton, without whose efficient work the Dairy department would have been seriously handicapped during the formative period of its existence.

Mr. Ralph's place has been filled by Mr. Alex. McKay, a well-known cheesemaker in Western Ontario, and who for a number of years has been an efficient Cheese Instructor among the factories in summer and at the Dairy School in connection with the College in winter. We were fortunate in securing Mr. McKay's services. Mr. G. Rickwood, of Beachville Creamery, takes Mr. Taylor's place. Mr. Rickwood is a graduate of the College Dairy Class, 1910. Mr. Stratton's place has not yet been filled, except temporarily for the coming season's work in experimental buttermaking.

About the middle of the summer Mr. F. G. Rice, who had been with us a little over one year as expert soft and fancy cheesemaker, and who had worked up quite a business in Stilton, Camembert and Cream Cheese, also in Devonshire cream, suddenly decided to drop the work and go into business for himself. We are expecting to take up this work again the latter part of the year, when we shall have another graduate of the Midland Agricultural College and Dairy School of England arrive and continue the work begun by Mr. Rice. Mr. Golding is at present investigating the soft cheese industry in France before sailing from England.

Proposed Changes in O. A. C. Creamery.

For a number of years the Dairy department has been gradually developing an important creamery business at the College. Last year there were made 124,034 lbs. of butter, while the total sales of butter and cream were valued at $32,700. This year the make was 184,599 lbs., valued at $49,026. Having demonstrated to the farmers about Guelph that it pays to patronize a well-managed creamery, and that the College can conduct a successful and profitable creamery business, we have decided to turn the commercial part of the work over to a firm in the City of Guelph, we reserving what raw material, in the form of milk and cream, we require for educational and experimental purposes. We shall purchase this outright from the said firm at *cost* price. In this way we hope to have more time for educational and research work than is possible at present. when the commercial features require too much of our time, and occupy a large share of the work done by our men and machinery. In order to continue the business, we should require more men and more machinery, which is not practicable in the present building and with present appropriations. The business has grown beyond our capacity to handle at present.

Mr. Stratton's report as Manager for the O. A. C. Creamery for the year Dec. 1st, 1909, to Nov. 30th, 1910, is as follows:

Prof. Dean,—I beg leave to submit the following summary of the business done by the Ontario Agricultural College Creamery for the year ending November 30th, 1910.

You will note a considerable increase in the amount of butter made over the previous year, as the year just closed has been an exceptionally good year for dairying in this district.

While the average price received per pound of butter has been .55 cents more this year, as compared with last, the average net price paid the patrons has been lower, due to a lower overrun and an increased price of one-half cent per pound fat charged for manufacturing since April 1st, 1910. The amount received by the Dairy Department of the College for manufacturing has been $6,713.29.

Respectfully submitted,

R. W. Stratton.

Summary.

Month.	Lbs. Fat Delivered.	Lbs. Butter made.	Total Sales.	Percent overrun.	Average selling price per lb. butter.	Net price per lb. fat to patrons.
			$ c.		c.	c.
December, 1909.....	10,228.03	12,209	3,620.87	19.3	29.5	31.4
January, 1910.....	8,838.45	10,337	3,023.68	17.	29.2	30.3
February	7,505.65	8,643	2,553.13	15.1	29.5	30.
March	10,356.24	12,214	3,624.32	17.9	29.7	31.
April.....	11,064.78	12,971	3,888.44	17.2	30.	30.5
May.....	15,988.33	18,622	4,867.58	16.5	26.	26.
June.....	19,983.83	22,951	5,293.50	14.8	23.	22.
July.....	16,925.23	19,612	4,723.81	16.	24.	23.4
August.....	17,670.83	20,731	5,117.38	17.3	24.7	24.4
September	15,837.28	18,730	4,840.85	18.2	25.8	26.
October.....	12,554.77	14,543	3,901.25	16.	26.7	26.6
November.....	11,164.88	13,036	3,571.79	16.	27.4	27.5
Totals and Averages.....	158,118.30	184,599	49,026.60	16.7	26.55	26.76

Official Cow-Testing.

This work has grown considerably during the past year. In 1909 we took charge of 134 seven-day tests and nine thirty-day tests. During the past year we supervised 273 seven-day, 6 fourteen day, and 32 thirty-day tests. Mr. C. S. Wood, of the dairy staff, gave as much time as possible to this work. Mr. Publow, of the Eastern Dairy School, took charge of the official testers for Eastern Ontario. In addition, we had several men employed during the winter most of the time. We are usually able to get graduates of the Dairy School, who work in factories during the summer, to do this work in winter. This plan seems to work very well.

All the cows tested, up to the present, have been of the Holstein-Friesian breed. None of the other breeders of dairy cattle have taken up the work of seven, fourteen, or thirty days' testing, but I am pleased to see that a number of these are entering their cows for the "Yearly Record of Performance," which is supervised by the Dominion Department of Agriculture.

The names and addresses of owners of cows tested during the past year are as follows:

Name and Address. Seven-day tests.	No. of cows.
Abbott, Fred, Harriettsville	5
Allison, P., Chesterville	3
Anderson, G. W., Rossmore	7
Bailey, W. J., Nober	6
Bollert, H., Cassel	3
Brown, W. W., Lyn	11
Carr, Fred, St. Thomas	4
Caskey, J. A., Madoc	6
Caughell, D., Yarmouth Centre	1
Cherry, W. H., Garnet	1
Clemons, G. W., St. George	3
Cohoe Bros., New Durham	1
Connell, R., Roebuck	9
Davidson, T., Spring Valley	2
Dent, T. H., Woodstock	4
Ede, P. D., Oxford Centre	6
Edmondson, C., Brantford	1
Flatt & Son, D. C., Millgrove	12
Foster, A. D., Bloomfield	8
Griffin, F. J., Burgessville	2
Hagerman, B. E., Minto	2
Haley, M. H., Springford	6
Haley, M. L., Springford	13
Hallman, A. C., Breslau	7
Hardy, A. C., Brockville	13
Hartley, T., Downsview	2
Hicks, R. F., Newtonbrook	4
Howes, I. N., Crampton	1
Hulet, A. E., Norwich	2
Inksetter, Robt., Copetown	1
Kilgour, Geo., Delmer	2
Laidlaw & Son, E., Aylmer	13
Leavens, B. R., Bloomfield	7
Lipsit, L. H., Straffordville	6
McGhee Bros., Beachville	2
McIntosh, A. J., Brinston	1
Mallory, B., Frankford	8
Mallory, F. R., Frankford	2
Manhard, G. H., Manhard	11
Osler, E. F., Bronte	9
Pallett, G. W., Summerville	2
Patterson, H. F., Alford Junction	4
Rettie, James, Norwich	4
Rice, George, Tillsonburg	2
Richardson, M., Caledonia	6
Rivers, W., Foldens	10
Schell, W. S., Woodstock	6
Slaght, Wm., Bealton	7
Smith and Son, A. E., Millgrove	2
Snyder, Elias, Burgessville	7
Stevens, W. C., Philipsville	2
Stewart, J. W., Lyn	6
Strader, Orrin, Brinston	2
Teeple, A. H., Curries	1
Wiltse, F. B., Athens	1
Wood, Tig, Mitchell	3
Worden, C. S., Lyn	1
Total	273

Fourteen-day tests.	
Connell, R., Roebuck	3
Hardy, A. C., Brockville	1
Hartley, T., Downsview	1
Osler, E. F., Bronte	1
Total	6

Thirty-day tests.	
Brown, W. W., Lyn	7
Caskey, J. A.	1
Hartley, T., Downsview	7
Laidlaw & Son, E., Aylmer	14
Osler, E. F., Bronte	2
Stewart, J. W., Lyn	1
Total	32

Applicants for Diplomas.

Name.	Address.	Diploma in
Carr, H. N.	Underwood, Ont.	Buttermaking.
Coleman, H. W.	Elliott, Ont.	Cheesemaking.
Farmer, R. W.	Morningside, Alta.	Buttermaking.
Grieve, T. W.	Moorefield, Ont.	Cheesemaking.
Hefler, F. L.	Exeter, Ont.	Buttermaking.
Lowe, H. B.	New Dundee, Ont.	Buttermaking.
Marshall, Lea.	Port Dover, Ont.	Buttermaking.
Marshall, Lea.	Port Dover, Ont.	Cheesemaking.
McEwan, J. G. A.	Lucknow, Ont.	Cheesemaking.
Neville, Norman.	Lambeth, Ont.	Cheesemaking.
O'Hara, A. J.	Lorenz, Ont.	Cheesemaking.
Rickwood, G.	Beachville, Ont.	Buttermaking.
Eastman, F. C.	Arkona, Ont.	Cheesemaking.
Gray, P. J.	Linden Valley.	Cheesemaking.

Samples Received for Testing.

During the year we have tested for fat samples sent in by farmers and factorymen: 126 samples of cream, 103 samples of whole milk, and 28 samples of skim-milk. In some cases bacteriological or chemical analysis was requested also, in which cases the samples were forwarded to the proper department.

CHEESE INVESTIGATIONS.

Moisture in Curd and Cheese, from Western Ontario Cheeseries.

This is a continuation of the work done last year on this question. Sample bottles were sent out to each of the Cheese Instructors in Western Ontario in the latter part of May, together with instructions as to sampling, mailing, etc. We expected to receive one sample of curd and green cheese weekly from each Instructor during the months of June and July, and samples of the ripe cheese one month later. For various reasons we received but 21 samples of the curd, 22 samples of green cheese and 11 samples of ripe cheese. The table which follows gives a summary of the work done, together with names of the factories from which samples were received.

Comparing the results with last year, we find the average percentage of moisture in the curds at dipping is about one per cent. higher this year (42.306 in 1910 and 41.445 in 1909); and the average percentage of moisture in the green cheese is also nearly one per cent. higher, 34.664, as compared with 33.898. We did not receive any samples of ripe cheese last year, hence cannot make a comparison. The average moisture content of the eleven samples of ripe cheese received in 1910 was 34.638 per cent.

TABLE SHOWING THE MOISTURE IN SAMPLES OF CURD, GREEN AND RIPE CHEESE, SENT BY WESTERN DAIRY INSTRUCTORS, 1910.

Name of Instructor	Date of receiving sample at Dairy Department.	Percent Moisture.			Factory from which Sample was received.
		Curd.	Green Cheese.	Ripe Cheese.	
T. F. Boyes	June 16 and July 13..	43.2	35.2	34.0	Delaware.
" "	July 27 and Aug. 26..	41.2	34.0	35.6	Belmont.
	Average	42.2	34.6	34.3	
J. R. Burgess	June 6 and June 22...	44.4	34.4	34.4	Silver Corners.
" "	" 27	42.8	32.8	..	Wallace.
" "	July 12	44.0	34.4	..	Marion Beaver.
" "	" 21	45.2	35.2	..	Millbank.
" "	Aug. 5	44.0	40.0	36.0	Rothsay.
	Average	44.08	35.36	35.2	
A. E. Gracey	June 9 and July 9....	44.4	35.2	35.6	Mossley.
" "	" 16	41.6	34.4	..	Crampton.
" "	July 8	41.6	34.4	..	Verschoyle.
" "	" 14 and 16	43.2	33.2	..	E. and W. Oxford.
" "	" 16 and 18	40.8	33.2	..	Brookbank.
" "	" 25	41.2	33.2	..	New Lawson.
" "	" 30	40.0	33.2	33.6	Burgessville.
	Average	41.828	33.828	34.6	
R. H. Green	June 4 and July 8 ...	43.2	34.4	35.2	Caledonia.
" "	" 18	41.2	35.2	..	Scotland.
" "	" 30	41.2	34.0	..	Rockford.
" "	July 20	..	33.2	..	Black Creek.
	Average	41.866	34.2	35.2	
G. McKenzie	June 1 and 28	43.2	36.0	34.8	North Oxford.
Geo. Travis	June 29 and July 27..	40.4	34.0	34.0	New England.
" "	July 4	41.2	34.0	33.2	Clear Creek.
" "	" 22 and Aug. 24..	40.4	34.0	34.0	South Middleton.
	Average	40.666	34.0	33.733	

Average of all:—21 samples of curd, 42.306; 22 samples of green cheese, 34.664; 11 samples of ripe cheese, 34.638.

MOISTURE IN CURD AND CHEESE, O. A. C., 1910.

In 1909, the average percentages of moisture in the O. A. C. curds at dipping, in the green cheese and in the ripe cheese were respectively 50.836, 35.526, and 35.005. During 1910, the averages for the same were, 49.282, 35.059, and 35.09, a slightly lower percentage of moisture in curd and green cheese this year as compared with last, while the ripe cheese was practically the same. This difference is probably due to the fact that the experimental cheesemaker in 1910 (Mr. McKay) is accustomed to stirring the curds more than did our former experimenter, Mr. Ralph. It will be noticed that the average percentages of moisture in green and ripe cheese are practically the same for 1910.

Comparing these results, with those obtained from the lots received from Western Ontario factories we find that the O. A. C. curds contained 6.976 per

cent. more moisture at dipping; the green cheese .395 per cent. more moisture; and the ripe cheese (one month old) .352 per cent. more moisture. The curds and green cheese at the O. A. C. correspond more closely with the lots sent to us from Western Ontario factories this year as compared with last, although our curds still have nearly seven per cent. more moisture at dipping. The green and ripe cheese are nearly alike.

One fact stands out prominently, viz., that there is little difference in the moisture content of green cheese and the same cheese one month old. In many cases the ripe cheese apparently contain slightly more moisture than do the green, which may be due to errors in sampling or to absorption of moisture by the cheese when in a damp ripening room. The evidence seems very clear and strong on this point, but the conclusion to be drawn is so contrary to all accepted theories and to the ideas of practical men, that we prefer to gather some further data before stating the conclusion in plain words.

We hope next year to obtain samples from Eastern Ontario factories and also to conduct some more exact tests in connection with our own work, when if the results confirm our present conclusions we shall be in a position to present the truth to the public, even though it may not commend itself to the practical cheesemaker, or even to the dairy scientist at first glance.

Moisture in Curds and Cheese.

During the past eight years we have done a good deal of work on the question of moisture in curds and cheese, and its relation to quantity and quality of cheese made. The methods used for determining moisture have been fully discussed in previous reports, hence we need not refer to this part of our work.

During the season of 1910 the work was continued along lines similar to those followed in 1908 and 1909, but with a new cheesemaker in charge of the practical part of the tests.

Stirring *vs.* Not Stirring Curds at the Time of Dipping—Acid and all other Points Similar in Both Vats.

The milk, as delivered in the usual way to our cheese room, was well mixed in a large vat, then equally divided between two smaller vats. Altogether there were used 17,284 lbs. milk, testing an average of 3.57 per cent. fat. The average percentage of fat in the whey from both lots was the same, .225. Both vats were treated as nearly alike as possible, except that the curds from the one vat (A) were not stirred; those from the other (B) were stirred in the usual way, or until they were what is termed "dry."

The average percentages of acid and moisture in the curds and cheese were:

	Average % Acid at			Average % Moisture* in		
	Dipping.	Milling.	Salting.	Curd.	Green Cheese.	Ripe Cheese.
A.....	.184	.6842	.993	54.04	35.48	35.36
B.....	.184	.69	1.053	49.64	35.28	34.88

*Moisture determined in but five experiments.

The average yield of cheese per 1,000 lbs. milk from the lots not stirred was 92.95 lbs.; from the lots stirred, 92.05 lbs. The percentage of shrinkage during one month was 2.70 for the lots not stirred and 2.67 for those from curds stirred in the usual way.

The quality of cheese is indicated in the table showing the average scores:

	Flavor.	Closeness.	Even Color.	Texture.	Total.
	(40)	(15)	(15)	(20)	(100)
A (not stirred)...	35.75	13.91	14	16.86	90.52
B (stirred).....	36.10	13.98	14.21	17.33	91.62

These results indicate an average quality of cheese scoring a little over one point higher from the curds stirred "dry."

Conclusions.

1. The yield of cheese was nearly one pound more per 1,000 lbs. milk by not stirring the curds at the time of dipping, or removal of the whey. This is partly due at least to more moisture in the cheese.

2. There was little or no difference in the fat lost in the whey, the development of acid after dipping (what difference there was being a tendency to the development of more acid in the lots stirred) nor in shrinkage during one month of ripening (curing).

3. The quality of the cheese was a little over one point better from the curds stirred.

4. It is probable that a medium amount of stirring of the curds at the time of dipping will prove to be the best for all-round good results. Just what is the best amount of moisture for curds to have at dipping has yet to be determined.

ONE VAT DIVIDED AT THE TIME OF DIPPING—

(A) Curd not stirred, (B) Stirred.

This also is a continuation of the work done during the previous two years. Thirty-two experiments were conducted during the season 1910. There were used in the work 646,870 lbs. milk, testing an average of 3.5 per cent. fat and 2.365 per cent. casein. The milk as delivered to us from the farms in the neighbourhood of the College was weighed, sampled and then run into a vat with a capacity of about 3,000 lbs. milk. The weight of milk used in one experiment varied from 1,551 lbs., the lowest, to 3,205 lbs. the highest. The average percentage of fat in the whey was .215.

The vat of milk was treated in the usual way up to the time of dipping or removal of whey from the curd. All the curd was then transferred to a curd sink where one-half was stirred "dry" and the other was not given any stirring—simply allowed to drain. The curd was divided into two lots as evenly as possible but not weighed, as this is not practicable with large curd. The after treatment of the two curds was similar.

The moisture was determined in twenty-one experiments out of the thirty-two made, with the following results:

	Percent Moisture in		
	Curd at Dipping.	Green Cheese.	Ripe Cheese.
A (not stirred)	53.219	35.572	35.327
B (stirred)	46.981	35.154	34.963

The curds at dipping, from the stirred lots, contained over six per cent. less moisture than did those not stirred; the green cheese nearly one-half per cent. less and the ripe cheese (one month old) about one-third of one per cent. less moisture.

Comparing these results with those obtained last year, the percentages of moisture are considerably lower, especially in the curds—both stirred and not stirred. This is probably due to difference in methods followed by two different cheesemakers.

There was very little difference in the rate and percentage of acid development in the two kinds of curd. Both had developed a little over one per cent. acid at the time of applying the salt. There was also little difference in the percentage of shrinkage, 2.37 and 2.30 during one month for the (A) and (B) lots respectively.

The quality of the cheese is indicated by the average scores of the two lots, which were as follows:

	Flavor. (40)	Closeness. (15)	Even Color. (15)	Texture. (20)	Total. (100)
A (not stirred)	36.18	14.18	14.25	17.52	91.19
B (stirred)	36.34	14.27	14.39	17.81	92.81

These averages of a number of scorings indicate little difference in quality of the cheese, what difference there is being in favor of the cheese made from curds stirred. This difference in the total average score was .62 of one point.

Conclusion.

The results of three years' work on this question indicate that there is probably little or no advantage in giving curds so much stirring at the time of dipping as is the common practice among cheesemakers; on the other hand it is probably an advantage to the quality of the cheese to do some stirring at the time the curd is placed in the curd sink, or upon a rack in the vat. How much is necessary must at present be left to the judgment of the cheesemaker until we discover some rapid method of moisture determination and decide how much moisture a curd ought to have at this time for the best results—if such a thing be possible under the varying conditions found at cheese factories.

Casein and Fat in the Milk of Nine Cows, Belonging to Three Different Breeds, During Nine Months, Nov. 16 to Dec. 31, 1909, April 1 to Nov. 15, 1910.

This is the third year for these investigations. Unfortunately on account of the absence of Mr. Wood, on official cow-testing work, and the resignation of Mr. Ralph, the records for three months, January, February and March, 1910, were not taken, which makes the year's work incomplete. We regret this very much and shall try to guard against a similar occurrence in future.

The same cows were tested during the past year as in 1909, except that the Jersey No. 129 was replaced, on account of her advanced age, by No. 138 in the month of June. The work will be continued with the same cows.

The tests were conducted along lines similar to those followed last year. Milk from each cow was weighed morning and evening, and samples for fat and casein determinations were taken once a week. The average pounds of milk, milk-fat and casein by month and for the year are based on these weekly tests. Seven of the cows were kept in the stable for the most part during the year, and fed silage, soiling crops, meal, etc., having the run of a small paddock part of the time; while two, Nos. 66 and 128, were at pasture during the summer.

The following tables give the records for each cow for nine months during the year, and also a summary of the records of each cow and for the breeds:

	Days Milking.	Lbs. Milk.	Lbs. Fat.	Lbs. Casein.
No. 111. Holstein, age 5 years. Freshened Sept. 5th, 1909, and Nov. 11th, 1910.				
November, 1909	15	570	17.67	10.83
December, "	31	1,106	38.18	22.94
April, 1910	30	868	28.81	18.56
May, "	31	797	26.58	16.20
June, "	30	756	25.35	15.97
July, "	31	602	22.55	13.53
August, "	17	175	6.77	4.45
November, "	4	168	6.21	4.03
Totals	279	5,042	172.12	106.51
Average %			3.41	2.11
No. 128. Holstein, age 9 years. Freshened Dec. 16th, 1909.				
December, 1909	14	630	22.68	15.12
April, 1910	30	988	34.73	22.22
May, "	31	973	32.42	22.19
June, "	30	895	31.72	21.40
July, "	27	264	11.	8.53
Totals	132	3,750	132.55	89.46
Average %			3.53	2.38
No. 76. Holstein, age 10 years, Freshened February 7th, 1908, and June 3rd, 1910.				
November, 1909	15	75	3.3	1.95
December, "	5	25	1.05	.67
June, 1910	27	1,280	43.33	27.37
July, "	31	1,463	52.45	25.35
August "	31	1,421	46.83	23.02
September "	30	1,169	40.28	24.61
October, "	31	1,102	36.62	23.93
November, "	15	562	18.42	11.37
Totals	185	7,097	242.28	138.27
Average %			3.41	1.94

	Days Milking.	Lbs. Milk.	Lbs. Fat.	Lbs. Casein.
No. 66. AYRSHIRE, age 10 years. Freshened April 8th, 1909, and March 25th, 1910.				
November, 1909	15	285	12.54	9.12
December, "	31	475	20.67	16.04
April, 1910	30	1,045	41.90	25.70
May, "	31	1,070	41.07	24.77
June, "	30	1,049	38.80	24.21
July, "	31	842	32.57	20.47
August, "	31	827	33.75	18.34
September, "	30	737	30.57	18.44
October, "	31	701	28.74	19.57
November "	15	331	13.73	8.45
Totals	275	7,362	294.34	185.11
Average%			3.99	2.51
No. 136. AYRSHIRE, age 7 years. Freshened August 25th, 1909, and September 2nd, 1910.				
November, 1909	15	495	22.77	13.36
December, "	31	947	44.68	26.25
April, 1910	30	612	27.25	17.16
May, "	31	484	20.19	12.84
June, "	30	343	14.30	9.47
July, "	10	50	2.	1.55
September, "	28	947	39.42	22.92
October, "	31	1,079	44.61	28.35
November, "	15	525	23.89	13.51
Totals	221	5,482	239.11	145.41
Average %			4.36	2.65
No. 133. AYRSHIRE, age 6 years. Freshened October 25th, 1909, and September 24th, 1910.				
November, 1909	15	750	27.	18.
December, "	31	1,503	54.64	27.32
April, 1910	30	692	24.40	16.46
May, "	31	401	15.58	10.83
June, "	30	236	9.84	7.11
July, "	10	40	1.8	1.2
September, "	6	172	5.28	4.1
October, "	31	1,000	32.26	23.54
November, "	15	500	16.88	12.10
Totals	199	5,294	187.68	120.66
Average %			3.54	2.27
No. 131. JERSEY, age 9 years. Freshened November 20th, 1909.				
November, 1909	10	310	11.47	7.44
December, "	31	949	37.77	23.93
April, 1910	30	720	32.03	17.05
May, "	31	687	30.93	15.91
June, "	30	669	29.04	16.69
July, "	31	630	27.65	15.13
August, "	31	543	24.72	13.27
September, "	30	423	20.17	11.87
October, "	27	251	13.08	7.62
Totals	251	5,182	226.86	128.91
Average %			4.37	2.48

	Days Milking.	Lbs. Milk.	Lbs. Fat.	Lbs. Casein.
No. 123. JERSEY, age 6 years. Freshened October 9th, 1909, and September 6th, 1910.				
November, 1909	15	375	17.	10.87
December, "	31	687	33.45	18.23
April, 1910	30	464	23.48	12.02
May, "	31	436	23.22	11.13
June, "	30	333	17.89	9.90
July, "	20	170	9.59	4.68
September, "	24	613	27.40	15.46
October, "	31	740	35.09	19.65
November, "	15	323	15.26	9.11
Totals	227	4,141	202.38	111.05
Average %			4.88	2.68
No. 129.* JERSEY, age 14 years. Freshened April 30th, 1909.				
November, 1909	15	255	13.16	6.88
December, "	31	489	25.66	12.97
April, 1910	28	280	14.70	7.55
No. 138. Freshened June 16th, 1910.				
June, 1910	14	560	20.16	12.32
July, "	31	1,100	40.2	24.64
August, "	31	1,156	45.96	27.06
September, "	30	890	39.95	23.10
October, "	31	790	37.10	23.29
November, "	15	370	18.07	10.81
Totals	226	5,890	254.86	148.62
Average %			4.32	2.52

* No. 129 retired on account of age. No. 138 takes her place.

SUMMARY.

No. of Cow.	Days Milking.	Lbs. Milk.	Lbs. Fat.	Lbs. Casein.
HOLSTEINS:				
76	185	7,097	242.28	138.27
128	132	3,750	132.55	89.46
111	279	5,042	172.12	106.51
	596	15,889	546,95	334.24
Average %			3.44	2.1
AYRSHIRES:				
66	275	7,362	294.34	185.11
133	199	5,294	187.68	120.66
136	221	5,482	239.11	145.41
	695	18,138	721.13	451.18
Average %			3.97	2.48
JERSEYS:				
131	251	5,182	226.86	128.91
123	227	4,141	202.38	111.05
129 and 138	226	5,890	254.86	148.62
	704	15,213	684.10	388.58
Average %			4.49	2.55
TOTAL—9 cows	1,995	49,240	1,952.18	1,174.
Average	221	5,471	216.90	130.44
Average %			3.96	2.38

Comments on Results.

1. The Jerseys milked for the greatest number of days (704), the Ayrshires next (695) and the Holsteins the least (596). The average number of days milking per cow during the period of testing was 221.

2. The Ayrshires produced the greatest number of pounds of milk, milk-fat and casein.

3. The highest average percentage of fat and casein in the milk by breeds was in that of the Jerseys. The average percentages of fat and casein for the nine cows were respectively 3.96 and 2.38.

The average percentages of fat and casein for the nine cows are somewhat lower than for those last year.

The range in percentages of fat and casein in individual cow's milk for the period of test was from 3.41 to 4.88 for the fat and 1.94 to 2.68 for the casein. The individual cow composite tests of morning and evening milk ranged from 3.3 to 5.2 per cent. for the fat and 1.9 to 4.1 per cent. for the casein in the case of a Holstein (No. 128); from 3.7 to 6.2 per cent. for fat and 2.2 to 3.5 for the casein in the Jersey's milk of No. 131.

None of the Ayrshires showed such a wide variation in percentages of fat and casein in their milk as did cows representing the other two breeds.

4. As in former years, the percentages of fat and casein tend to increase quite markedly towards the end of the period of lactation.

5. So far as we can judge from the data on hand the food does not appear to affect the percentages of fat and casein in the milk. Lactation appears to be a more important factor than either food or season of the year.

6. The Jerseys produced 1.76 lbs. fat for each lb. casein in the milk.
The Jerseys produced .56 lbs. casein for each lb. fat in the milk.
The Holsteins produced 1.63 lbs. fat for each lb. casein in the milk.
The Holsteins produced .61 lbs. casein for each lb. fat in the milk.
The Ayrshires produced 1.59 lbs. fat for each lb. casein in the milk.
The Ayrshires produced .62 lbs. casein for each lb. fat in the milk.

Fat and Casein in Patrons' Milk Delivered at the Dairy Department During Season 1910.

This is the third year during which these investigations have been conducted. In 1909 there were eleven patrons sending or delivering milk to our cheese room; in 1910 there were twelve patrons, most of whom were the same as last year. The percentage of fat was determined with a Babcock tester and the casein with a Hart tester, both of which have been fully described in previous reports. From two to four samples for fat and casein determinations were taken from each patron's delivery during each month of the cheese season from May to October. The percentages of casein and fat given in the table represent the average of monthly and season's tests. It will be noticed that some of the patrons did not send milk throughout the whole season.

The extreme variations in the percentages of casein in individual patron's milk were from 1.6 to 3.4; and the fat, 2.8 to 6.2. The variations of casein percentages by months were from 2.07 for July to 2.85 in October; the monthly variations for fat were from 3.46 in May to 4.8 in October. From the foregoing we learn that there is considerable variation from month to month in the percentage of casein and fat in the cows' milk delivered by patrons of a cheese

factory. This last season, and also in 1909, the lowest percentages of casein in the milk delivered to our cheese room was in July. In both seasons the highest percentages of casein were found in the milk for the months of September and October. It is doubtless due to this fact, as well as to an increased percentage of fat in the milk during these months, that cheesemakers find it takes much less milk to make a pound of cheese in the autumn than it does earlier in the season. Weather conditions may also have some effect, but the chief causes are an increase in the percentages of casein and fat in the milk, these increases being due to advancing lactation in the case of most of the cows, which usually freshen in the spring for the cheese season of each year.

Patron.	May.		June.		July.		Aug.		Sept.		Oct.		Season.	
	Casein	Fat.	Casein	Fat.	Casein	Fat.	Casein	Fat.	Casein	Fat.	Casein	Fat.	Casein	Fat.
	%	%	%	%	%	%	%	%	%	%	%	%	%	%
No. 1	2.5	3.6	2.55	3.5	2.23	3.56	2.3	3.55	2.93	3.83	2.85	3.9	2.56	3.67
" 2	2.4	3.7	2.33	3.6	2.20	3.40	2.53	3.70	2.86	3.76	2.92	4.1	2.54	3.71
" 3	2.5	3.55	2.33	3.75	2.05	3.60	2.60	4.15	2.93	4.13	3.10	4.82	2.58	4.00
" 4	2.4	3.70	2.28	3.58	2.00	3.35	2.40	3.95	2.66	3.86	2.52	4.12	2.46	3.77
" 5	2.3	3.60	2.40	3.68	2.15	3.85	2.68	4.00	3.10	4.66	3.02	4.72	2.61	4.09
" 6	2.2	3.20	2.15	3.23	1.95	3.45	2.40	3.95	2.50	3.60	3.00	4.77	2.55	3.85
" 7	2.4	3.45	2.32	3.6	2.05	3.27	2.35	3.65	2.36	3.66	2.55	3.85	2.34	3.56
" 8	2.3	3.15	2.20	3.15	..	..	..	..	..	..	..	..	2.25	3.15
" 9	..	..	2.33	3.53	2.13	3.65	2.58	3.50	2.86	4.33	2.8	4.2	2.54	3.84
" 10	..	..	2.40	4.05	2.20	3.70	2.50	3.95	2.66	4.05	2.9	4.72	2.53	4.09
" 11	2.2	3.20	2.35	3.40	2.08	3.40	2.40	3.80	..	..	..	..	2.26	3.45
" 12	..	..	2.20	3.60	2.00	3.20	..	..	..	..	..	..	2.10	3.40
Average of all	2.36	3.46	2.29	3.55	2.07	3.50	2.44	3.82	2.76	3.87	2.85	4.80	2.46	3.83

Vat Tests of Casein and Fat, Season 1910.

This is a continuation of the work done during the seasons of 1908 and 1909. The vats of milk were tested for casein and fat as often as possible during the season. The averages for the past three years are as follows:

Year.	Average per cent.	
	Casein.	Fat.
1908	2.39	3.67
1909	2.50	3.60
1910	2.46	3.60

It will be noticed that the average percentages of fat and casein are fairly uniform for the three years. While the individual samples vary considerably in the same month, and also from month to month during the season, yet when we average the whole season and compare results thus obtained during three years, there is not a great deal of difference from year to year so far as the mixed milk furnished to the cheese room of the College is concerned.

The following table shows the range and average of vat tests during the season of 1910:

Month.	No. Vat Tests Made.	Per cent. Casein in Milk.		Per cent Fat.		Av. lbs. Cheese per lb.		Lbs. Milk to make one lb. Cheese.
		Range.	Average	Range.	Average	Casein.	Fat.	
May	10	2.1 to 2.4	2.31	3.3 to 3.6	3.43	3.94	2.60	11.00
June	25	2.2 to 2.6	2.38	3.3 to 4.0	3.51	3.95	2.67	10.76
July	21	2.1 to 2.4	2.26	3.2 to 3.6	3.42	3.91	2.53	11.36
August.....	27	2.2 to 2.9	2.50	3.2 to 4.0	3.69	3.69	2.47	11.01
September ...	16	2.7 to 3.0	2.80	3.8 to 4.0	3.93	3.54	2.46	10.13
October	6	2.6 to 2.9	2.78	3.6 to 4.1	3.88	3.52	2.54	10.07

During the season of 1908 the highest percentages of casein by months in the vats of milk were in June, September and October; in 1909 the highest casein tests were during May, June, September and October; while in 1910 the percentages of casein were highest in August, September and October. In all three years, the highest percentages of casein in the cheese milk delivered to us were in September and October. This is probably due to advanced lactation in the cows furnishing the milk, as we find this to be the most important factor affecting the percentage of casein in cows' milk.

Relation of Casein and Fat in Milk to the Yield of Cheese by Months, 1910.

This is the third year for this line of work showing the variation in casein and fat, and the yield of cheese by months during the season. Special experiments were not made, but the following table of results is based on the work done with the high and low casein tests by averaging the results by months:

——	May.	June.	July.	Aug.	Sept.	Oct.
Lbs. Milk	1,020	4,940	4,208	3,016	3,968	3,540
Average percentage fat in milk.....	3.50	3.47	3.40	3.84	3.95	4.07
Lbs. fat in milk	35.70	171.79	143.07	115.81	156.73	144.07
Average percentage casein in milk.....	2.30	2.38	2.31	2.50	2.79	2.84
Lbs. casein in milk	23.46	117.69	97.20	75.40	110.70	100.53
Average percentage fat in whey	.22	.214	.217	.26	.28	.23
Lbs. cheese made	94.	465.23	376.63	283.81	391.40	355.19
Lbs. cheese per lb. fat in milk	2.63	2.70	2.63	2.45	2.49	2.46
Lbs. cheese per lb. casein in milk	3.56	3.69	3.87	3.76	3.53	3.53
Lbs, milk per lb. cheese.....	10.85	10.61	11.14	10.62	10.13	9.96
Lbs. cheese per 1000 lbs. milk	92.15	94.17	89.50	94.10	98.63	100.32

The average percentage of fat in the milk for the season was 3.7; that of the casein 3.53. The average percentage of fat in the whey was .236. The average pounds of cheese per pound of fat in the milk was 2.56, and of the casein 3.74. The average pounds of milk required to make a pound of cheese was 10.52. The average yield of cheese per 1,000 lbs. milk used in these experiments was 95.02.

The foregoing table indicates the following results:

1. The highest percentages of fat and casein in the milk were during the months of August, September and October.

2. The greatest yield of cheese per pound of fat in the milk was in the month of June, and the highest yield per pound of casein in the milk was in July. The lowest yield per lb. fat in the milk was in August, and per pound of casein was in September and October—the same, 3.53 for both months.

3. The pounds of cheese per 1,000 pounds milk was greatest in October and least in July. The number of pounds of milk required to make a pound of cheese varied from 9.96 in October to 11.14 in July.

4. Last year we said, "Theoretically, fat and casein in the milk should govern the yield of cheese; practically, this is not always the case." We can readily see how this might be true, because so many factors enter into the question of cheese-making, such as, skill of the cheesemaker, losses of fat and casein in whey and during the process of making the cheese, amount of moisture left in the curd and cheese, length of time during which cheese is kept before selling, conditions of temperature, moisture, etc., in the ripening room, but *on the average* we shall not arrive at a more satisfactory basis of settlement with patrons than the fat-casein method. In the foregoing experiments the extreme range in yield of cheese per pound of fat and casein by months was from 1.607 pound of cheese in the month of June to 1.452 in October—a difference of but .155 of a pound from May to October. The month of June seems to be a favorable one for a high yield of cheese in proportion to the fat and casein in the milk, although the pounds of cheese per 100 pounds milk are usually greater in September and October.

Tests on the Comparative Influence of the Casein in Milk on the Weight and Quality of the Cheese.

This is the third year we have conducted experiments on this question. The milk as delivered to our cheese room by the different patrons was tested frequently during the season for casein in order to find out which milks were comparatively low, and which comparatively high in casein. During the season, we aimed to make one experiment each week, dividing the milk between two vats, containing as great a variation in the percentage of casein as it was possible to obtain. Altogether, there were eighteen experiments made, in which were used 20,692 pounds milk. One-half this weight of milk contained an average of 3.862 per cent. fat and 2.652 per cent. casein. The other half tested an average of 3.527 per cent. fat and 2.442 per cent casein—the average difference being about .3 per cent. fat and .2 per cent. casein for all the lots in each of the two kinds—high and low casein milk.

The average yields of cheese per pound of fat and casein are shown in the table; also the average score of the cheese.

	Lb. Cheese per		Average Score of the Cheese.				Total.
	Lb. Fat.	Lb. Casein.	Flavor.	Closeness.	Color.	Texture.	
High Casein	2.50	3.68	35.30	14.09	14.20	17.25	90.13
Low "	3.62	3.79	35.95	13.99	14.11	17.13	91.18

The percentages of moisture in the curd and cheese were determined in eight of the tests with the following results:

	Average Percentage of Moisture in		
	Curds at Dipping.	Green Cheese.	Ripe Cheese.
High Casein.....	49.825	35.15	35.1
Low Casein.....	50.250	35.10	35.3

The average percentages of casein in the milk for those lots in which the moisture was determined in the curds and cheese were respectively 2.437 and 2.287 for the high and low casein. The yield of cheese per 1,000 pounds milk was 97.34 for the lots containing high casein and 92.7 for the lots with comparatively low casein. The average pounds of milk required to make a pound of cheese were 10.27 in the case of the former and 10.78 in the latter. The average percentage of fat in the whey from the high casein lots was .25 and for the low, .23.

The percentages of shrinkage in the cheese during one month was 2.5 for the lots made from milk with the higher casein content, and 2.63 for those with the lower percentage of casein.

Conclusions.

1. The milk containing the higher percentage of casein (.2 per cent.) produced over 4½ lbs. (4.64) more cheese per 1,000 lbs. milk; and required over one-half pound (.51) less milk to make a pound of cheese as the average for the season, when compared with yields from milk testing lower in casein (.2 per cent.) and fat (.3).

2. As casein is the moisture carrying constituent of milk we should naturally expect the curd and cheese from the higher casein lots to have the more moisture, but in the eight lots tested for moisture there was not much difference in the results, what difference there was, being a higher moisture content in the curd and cheese made from the milk with a lower percentage of casein. These lots (low casein) also lost more by shrinkage while ripening or curing for one month.

3. The average score of the cheese both last year and this year, was slightly higher for the lots made from milk with the lower percentage of casein.

Fine vs. Coarse Wire Curd Knives.

This work is a continuation of that done during the years 1908, 1909. During the season of 1910, fifteen experiments were conducted in which were used 17,530 lbs., milk testing an average of 3.6 per cent. fat. The weight of milk used in each vat ranged from 452 to 816 lbs. The milk was first mixed thoroughly in a large vat, then equally divided between two smaller vats.

All the steps in the process of cheesemaking were similar in both vats, except that one curd was cut twice with a one-quarter inch wire perpendicular knife, while the other was cut twice with a three-eighths perpendicular wire knife. Both curds were cut once with a three-eighths horizontal blade knife.

In all three years there has been a larger yield of cheese by using the coarser knife. The differences are shown in the table:

	Lbs. Cheese per 1000 lbs. milk.	
	¼ inch Knife.	⅜ inch Knife.
1908	95.3	95.7
1909	92.5	92.8
1910	93.33	94.01
Average 3 years	93.33	94.17

The average increased yield of cheese per 1,000 lbs. milk is .46 (nearly one-half) a pound. While this is not very large, it means about three pounds more cheese on each large vat of milk, and about nine pounds more cheese daily in a three vat factory. This extra cheese would pay the daily wage of one helper in the factory, and in these times of close competition and small profits it is necessary to look after all the leaks in the business. In but five of the experiments was the moisture in curd and cheese determined. The average of these five gave the following results:

	Percent of Moisture in		
	Curd at Dipping.	Green Cheese.	Ripe Cheese.
Curd cut with ¼ inch knife	48.04	34.72	34.96
Curd cut with ⅜ inch knife	49.92	35.12	35.12

It will be noticed that the curd, green and ripe cheese all contained slightly more moisture in the lots cut with the coarser knife.

We may next consider the effects upon the loss of fat in the whey and quality of cheese. The average percentage of fat in the whey from the lots in which the curd was cut with the fine knife was .252; from the lots cut with the coarser knife .259—practically no difference.

The average scores of the cheese were:

	Flavor.	Closeness.	Even Color.	Texture.	TOTAL.
	(40)	(15)	(15)	(20)	(100)
Fine Knife	36.24	14.21	14.26	17.15	91.86
Coarse "	36.44	14.166	14.33	17.22	92.15

All the cheese in this and all other experiments were given full score for "finish" (10 points). It will be seen that there was not much difference in the quality of the cheese, what difference there was being in favor of the cheese from the curds cut with the coarser knife.

Conclusion.

1. The yield of cheese was greater by using the coarser knife, being over one-half pound more cheese per 1,000 lbs. milk in 1910, and nearly one-half a pound more as the average of three years' experiments.

2. In all three years the curds at dipping, and the green and ripened cheese contained more moisture by using the coarser knife. This probably explains the increased yield of cheese.

3. There was little or no difference in the loss of fat in the whey from the two methods of cutting the curd.

4. There was little difference in the quality of the cheese. what there was being in favor of the cheese from the curds cut with the coarser knife in 1910.

5. As a result of three years experiments (two different expert cheesemakers being in charge of the work), it is doubtful whether it is advisable to use so fine a perpendicular curd knife as one having the wires but one-quarter inch apart.

Loss of Making Over-Ripe Milk Into Cheddar Cheese.

This is a continuation of the work done during the past two seasons. The plan of conducting the experiments was to manufacture the milk which was delivered in an over-ripe condition into cheese, and next day. when the milk was normal, make this also into cheese and note the difference in results. There are many objections to this plan from a scientific viewpoint, but it corresponds with conditions at an ordinary cheese factory, and the object was chiefly to find out what the loss, and what the difference in quality of cheese, where a cheesemaker is obliged on certain days to handle a considerable portion of the milk delivered in an over-ripe condition.

Seven tests were made of milk over-ripe and five tests of normal milk received next day. There were used of over-ripe milk 16.412 lbs.. containing an average of 3.46 per cent fat and 2.36 per cent. casein. The average percentage of fat in the whey from these lots was, .26. The normal lots consisted of 6.408 lbs. milk containing an average of 3.38 per cent. fat. 2.31 per cent. casein. The whey tested an average of .23 per cent. fat.

The lots of over-ripe milk curds remained in the whey an average of 51 minutes; the normal lots an average of 2 hours and 39 minutes. The average yield of cheese was 88.96 lbs., per 1.000 lbs. milk from the over-ripe lots and 91.44 lbs.. from the normal lots. In the first case it took an average of 11.17 lbs. milk to make a pound of cheese and in the second or with the normal lots. 10.78 lbs. milk per pound of cheese.

The moisture was determined in the curd and cheese from five lots of fast working or over-ripe milk, but in only one of the normal lots. The average percentages of moisture in curd and cheese are shown in the table:

	Percentages of Moisture in		
	Curd at Dipping.	Green Cheese.	Ripe Cheese.
Normal Milk.....	48.40	35.6	35.20
Overripe Milk	43.92	35.2	35.04

The percentages of shrinkage during one month were 2.2 and 2 respectively for the normal and over-ripe lots of cheese.

The average scores of the cheese were:

——	Flavor.	Closeness.	Even Color.	Texture.	Total.
	(40)	(15)	(15)	(20)	(100)
Normal Milk	36.25	14.89	14.89	17.81	91.93
Overripe Milk....	35.83	14.20	14.27	17.63	93.84

Conclusions.

1. This year the normal milk produced an average of 2.58 lbs. more cheese per 1,000 lbs. milk as compared with similar milk (but with slightly higher percentages of fat and casein), over-ripe. The average of three years is a little over 2 lbs. more cheese per 1,000 lbs. milk from the normal lots.

2. The normal milk curds and cheese contained higher precentages of moisture.

3. The quality of the cheese made from the normal milk was superior to that produced from over-ripe milk.

All these point to the importance of delivering milk to cheeseries in a sweet condition and show the losses incurred in both yield and quality of cheese by allowing the milk to develop too much acid. Milk containing .2 per cent. acid or over, is too ripe for good results in cheesemaking. Cleanliness and rapid cooling of the milk to 60 degrees or 65 degrees F. is the remedy for over-ripe milk.

Effect of Acid at the Time of Dipping.

Formerly the practice of Canadian Cheddar Cheesemakers was to give the curd considerable acid before "dipping" or removal of the whey, in order to give the acid "a good start." Latterly the cheesemakers have been giving less acid on the curd at the time of dipping, and have been working closer to the "sweet line." Acid is a good servant of the cheesemaker, but a bad master. He who knows how to control the acid in his work has mastered the most difficult part of the art of cheesemaking.

In order to throw some light on the question, a series of experiments was conducted during the season of 1910, in which were used 8,114 lbs. milk testing an average of 3.49 per cent. fat and 2.33 per cent. casein. The milk was thoroughly mixed before dividing into two equal parts. Rennet at the rate of three ounces per 1,000 lbs. milk was added, and both lots were treated as nearly alike as possible, except that the A lots were dipped with an average of .2 per cent. acid, while the B lots averaged .17 per cent. acid at the time of the removal of the whey. The percentages of acid at all the other important stages of cheesemaking were practically the same for both lots, the B lots having slightly more acid—1.05 per cent. as compared with 1.025—at the time of applying the salt.

The average percentages of fat in the whey were .247 for the A lots and .234 for the B lots.

The yields of cheese per 1,000 lbs. milk were 91.685 lbs. of ripened cheese (1 mo. old) from the A lots and 92.418 lbs., from the B lots or the lots with lower acidity.

The percentages of shrinkage during one month were 2.248 for the A lots (high acid) 2.091 for the B lots.

There was not much difference in the quality of the cheese. The average scores were as follows:

——	Flavor.	Closeness.	Even Color.	Texture.	Total.
	(40)	(15)	(15)	(20)	(100)
A	36.80	14.000	14.2	17.7	92.7
B	36.75	14.075	14.3	17.8	93.025

Conclusions.

1. The yield of cheese in these experiments was about three-quarters (.733) of a pound more per 1,000 lbs. milk by dipping the curds comparatively sweet, hence cheesemakers may expect to make a "better average," or take less milk to make a pound of cheese by dipping sweet, or with not over .175 per cent. acid. However, conditions vary in different factories and no hard and fast rule can be laid down on this point. The percentage of acid at the time of dipping has to be varied according to circumstances, but it is safer to err on the side of dipping a little too sweet, than to have too much acid at this time. What may be considered high acid for setting or dipping at one factory may be all right for a neighboring factory. There is something about this acid question which is not understood. It is probably due to a complication of results caused by the acid character of the casein and inaccurate methods of determining lactic acid.

2. There was slightly greater loss of fat in the whey and a greater loss in shrinkage from the high acid lots. This was probably due to the contracting effect of acid upon curd and cheese, causing a greater expulsion of fat and moisture from the casein which is the "carrier" in cheese of practically all the other constituents.

3. Within the range of acidity used in these experiments there did not appear to be much difference in the effects of acidity at the time of dipping upon the quality of the cheese. The average scores of both lots were practically the same.

4. The relative percentages of moisture in the curds at the time of dipping and in the green cheese were slightly greater for the B lots or those dipped with low acid, but in the ripe cheese the difference was but .2 per cent. higher for the B lots—35 as compared with 34.8. These results indicate that dipping with low acid tends to retain more moisture in the curds and slightly more in the green cheese, but that the ripe cheese will have very little difference in moisture content.

Effect of Acidity at the Time of Adding the Rennet (Setting).

In the early days of cheesemaking, the cheesemaker was guided by his senses of taste and smell in order to know when the milk was ready to "set," or have the rennet added. As these senses proved unreliable in many cases, something more accurate was found necessary. First, a teaspoonful of rennet was added to a cup

of milk at a standard temperature of 86 degrees F. Because cups and spoons varied considerably in size and milk and rennet could not be measured accurately in them, the ounce rennet test (sometimes called the Harris test) was next used. In this test to eight (8) ounces of milk at a temperature of 86 degrees F., was added one drachm of standard rennet extract, and the time for coagulation was carefully noted. This proved to be a great improvement over preceding tests, but was open to objections—it wasted considerable milk, took too long to make a test, too many factors entered into the results, such as temperature, time, knowing when coagulation had taken place, etc., but chiefly because the rennet test measures the susceptibility of milk to the action of rennet and not its acidity, except indirectly, and it is the acid condition of the milk which the cheesemaker desires to know, rather than its sensitiveness to rennet action.

In consequence of these objections to the rennet test the milk acidimeter was devised. It is based upon well-known laws of chemistry, and hence has the advantage of any preceding tests, which were more dependent upon physical conditions and lacked accuracy.

There is, however, one objection to the milk acidimeter in its present form: it assumes that all the acid, and substances of acid character such as casein, are *lactic* acid, whereas we know this is not the case; yet up to the present no simple test for determining the lactic acid in milk, whey, etc., has been devised.

The percentage of acidity which milk ought to have at the time of adding the rennet ("setting the vat") varies a good deal under different conditions and at the various factories. It is probable that the acid nature of casein is the chief factor in the question. Where the milk contains a high percentage of casein the milk is "set" with an apparently high acid, but the probability is that so far as lactic acid is concerned it may be set with no more acid than average factories.

There is need of some determinations as to the actual content of casein in the milk as delivered to the cheeseries of the Province. We hope to be able to do some work along this line next season.

The experiments conducted at the O. A. C. Cheesery during the season of 1910, in the months of June, July and August, throw some light on the question as to the effect of acidity at the time of adding the rennet to the milk, or what is known by the cheesemaker as "setting the vat." In this work there was used 9,128 lbs. milk testing an average of 3.45 per cent. fat and 2.36 per cent. casein. The milk in each experiment was mixed in one vat, then divided into two equal parts, to which rennet at the rate of three ounces per 1,000 lbs. milk was added.

The average percentages of acidity at the time of renneting were .239 for the A lots, and .185 for the B lots. The percentages of acidity at the other stages of cheesemaking were as nearly alike as possible, being .18 at dipping for both lots; .693 and .681 at milling; 1 and .974 at setting, respectively for the A and B lots.

The percentages of fat in the whey were respectively .29 and .217 for the A and B lots. The chief remaining points are indicated in the table of results as follows:

——	Time from		Yield of ripened cheese (1 mo. old).	% Shrinkage.	Score of Cheese. (100).
	Setting to dipping.	Dipping to salting.	Per 1,000 lbs. milk.		
A	41.7 minutes.	4 hrs. 8 min.	88 lbs.	2.13	91.12
B	2 hrs. 27 min.	3 hrs. 57 min.	89.04 lbs.	2.50	91.75

	Percentages of Moisture in		
	Curd at Dipping.	Green Cheese.	Ripe Cheese (1 month old).
A	49.2	33.666	35.333
B	49.4	33.800	34.533

Conclusions.

1. The high acid lots at the time of renneting were ready to "dip," or have the whey removed, in a very short time—less than three-quarters of an hour after adding the rennet, but it took slightly longer (11 minutes) for these curds to get in a fit condition for applying the salt, as compared with the normal or low acidity lots.

2. The loss of fat in the whey was slightly greater from the high acid lots, but the difference was not so great as we might expect—.29 as compared with .217 per cent. fat in the whey from the two lots, as the average of seven experiments.

3. The yield of cheese was greater from the normal lots—a little over one pound per 1,000 lbs. milk, although the difference in "pounds of milk to make a pound of cheese" was only about one-tenth—11.219 as compared with 11.108.

4. The quality of the cheese was slightly better from the normal or low acid lots, but the difference was not so great as we should expect.

5. The moisture was slightly greater in the B lots at dipping and in the green cheese, but was greater in the ripe cheese by .8 per cent.

Comparing Two Brands of Rennet Extract.

The Dairy Instructors in their work among the factories find a number of brands of rennet extract in use by the various makers. Some of them have a very high acidity, the manufacturers apparently relying upon an acid or acids to obtain "strength of rennet." The chemical and dairy departments of the College undertook some investigations with reference to one of these brands which was high in acid. This brand, known as B1, was sent to us by Mr. Frank Herns, Chief Dairy Instructor for Western Ontario, and contained 1.2 per cent. of acid, as determined with the acidimeter used in our regular work for cheesemaking. Hansen's Extract, which we use, contained but .8 per cent. acid. On October 6th, about five months after the experiments were made, the Hansen's rennet tested .8 per cent. acid and B1 1.22 per cent. acid.

Three experiments were made to compare these two rennet extracts. There were used 3,982 lbs. milk testing an average of 3.54 per cent. fat and 2.4 per cent. casein. The milk was thoroughly mixed, then divided into two equal parts, except in the case of the first experiment, when the quantity of milk on hand was too large to divide into two equal parts. The larger portion had Hansen's rennet added to it. Both lots were worked as nearly alike as possible. The curd from the B1 rennet was not so firm and smooth as that from the Hansen's, otherwise there did not appear to be much difference in the curds, or coagulum, from the two rennets. The percentage of acidity at "setting," "dipping," "milling" and "salting" were practically the same for both lots. The average percentages of fat in the whey were .244 from the Hansen lots and .282 from the B1 lots. The yields

of ripe cheese (one month old) per 1,000 lbs. milk were 91.869 lbs. from the Hansen lots and 91.827 from the B1 lots. The loss in shrinkage during one month was 2.38 per cent. for the Hansen, and 2.1 per cent. for the B1 lots. The average total scores were 92.43 and 92.25 out of 100, respectively, for the Hansen and B1 lots.

Other than the slight difference in the coagulum, the results indicated little or no difference in the "working" of the milk or curd from the two brands of rennet, while the yield and quality of the cheese were practically the same for both.

These cheese were held for about six months after making and there was still little or no difference in the quality of the cheese. On theoretical grounds there would seem to be danger in using a rennet having an acidity of over one per cent., but according to these tests there appears to be little or no objection to such rennet, practically.

Methods of Pressing Cheese.

These tests are a continuance of the work done in 1908, when experiments were conducted to compare pressing lightly for two days with normal, rather heavy pressure for one day. Three experiments were conducted during the past season on this point. The results showed little or no difference in the quality of the cheese. We should expect the pressing for two days to produce "closer" cheese, but the average scores for "closeness" were 14.41 and 14.25 respectively for those pressed two days and those pressed for one day, a difference of but .16 of a point in favor of two days' pressing. The total scores were respectively 92.57 and 92.65 or practically the same.

Only one experiment was made comparing heavy pressure applied to curds at once after placing in the hoops with the usual method of increasing the pressure gradually. The loss from the time the curds were weighed into the hoops up to one month after making was 8.72 per cent., where heavy pressure was applied at once; and for those pressed in the usual way the loss was 8.77 per cent.—practically no difference.

The cheese made by applying heavy pressure at once to the curds scored one point less in "closeness" and half a point less in "texture," making a total of 1½ points less in the score of the cheese, as compared with the scores of similar cheese pressed gradually in the usual way.

Sampling Milk from the Weigh Can for Fat and Lactometer Determinations.

The question has arisen in connection with the taking of samples at creameries and cheeseries from the milk as dumped into the weigh can, whether or not, in the time taken to weigh and sample and also possibly to do a little gossiping with the patron or milk-hauler, the fat would not rise sufficiently to introduce considerable error. Two tests were made during the past season, taking samples at two-minute intervals from both top and bottom of the weigh can after the milk had been emptied from the patron's milk can into the weigh can at our cheese room.

In the first test of samples taken from the top of the can at two minute intervals there was no difference until fourteen minutes had elapsed, or seven periods of two minutes each. The percentage of fat at this time was one-tenth of one per cent. higher—3.7 instead of 3.6 per cent. fat as in previous tests. At the end of 16 minutes the percentage of fat in the sample taken from the top of the can was 3.8, an increase of .2 per cent. fat.

The lactometer reading was 31.8 (specific gravity, 1.0318), at the beginning of the test, the same at the end of twelve minutes, and at the end of sixteen minutes it was 31.3.

Samples from the same lot taken from the bottom of the can showed no difference in fat percentage until the fifth test, or at the end of ten minutes when it had dropped from 3.6 to 3.5, at which the test remained up to the end of the eighth test, or sixteen minutes after the milk had been emptied into the weigh can. The lactometer reading was constant throughout the tests of samples from the bottom of the can, viz., 31.8.

A second test was made with milk testing 3.3 per cent. fat, and in this case there was no difference in the tests of samples from either top or bottom of the can up to twelve minutes after emptying the milk into the weigh can.

Conclusion.

From these tests we may conclude that there is little danger of error in sampling milk from a weigh can up to ten or twelve minutes after emptying the milk from the patron's can into the can used for weighing at the factory. The fat and solids-not-fat are so thoroughly mixed with the serum after dumping from one can to another that the fat does not appear to rise until after considerable time has elapsed. Unless the person doing the weighing and sampling does a great deal of talking, or some accident happens to prevent sampling within ten minutes after delivery, we may conclude that no error will be introduced in the ordinary method of sampling milk as followed in Canadian creameries and cheeseries.

Butter Experiments.

Owing to the large make of butter in our creamery during the season of 1910, the men and machinery were almost wholly occupied with the commercial phase of the work, hence there was very little time for doing experimental or research work with reference to buttermaking. As we are doing away with the commercial features of the dairy department at the end of the present year, we shall in future be able to do more research work with reference to the many questions which confront buttermakers.

Pasteurizer Coating on Inside.

We have been frequently troubled with the pasteurizer coating on the inside with an albuminous substance, which prevents the heat being transferred from the steam-jacket to the cream as it passes upward in the machine. At times this becomes so troublesome that the rate of pasteurization is reduced more than one-half, and in some cases it is necessary to stop the machine and clear the coating before the work can be completed.

The machine we use is one imported from Denmark, made of copper, with an outside steam-jacket. The cream enters at the bottom and is revolved by means of a paddle against the steam-heated surface; at the same time the cream is elevated and leaves the machine near the top at a temperature of 180° to 185°F.

During April, May and June fourteen experiments were conducted with cream of varying degrees of acidity, from .23 to .39 per cent. It was found that the coating was most troublesome when the cream contained between .2 and .3 per

cent. acid, as determined with an ordinary dairy acidimeter. When the cream contained over .3 per cent. acid there was little or no difficulty. During the summer, when practically all of the cream received is sour, there is no difficulty in pasteurizing; but in the winter and early spring, when the cream is comparatively sweet, there is always more or less trouble with the cream collected from farmers. This difficulty has not occurred when the cream has been separated at our creamery from whole milk and is then pasteurized.

So far as we can see at present the difficulty is associated with gathered cream containing an acidity of between .2 and .3 per cent., but why it should occur at this particular stage of acidity is not yet clear. We hope to have some more light on the question in the future.

Pasteurizing Cream At Once after Delivery Compared with Pasteurizing the Following Day.

In order to note the effect of acidity on similar cream for pasteurizing and making butter two experiments were conducted on April 25th and 26th, by mixing all the cream delivered to us in one vat on each of these two days. One-half of the cream was pasteurized during the afternoon of the day of delivery and the other half was held over until the following morning before being pasteurized. These held over lots were churned the following day, or the second day after the cream was delivered.

The average percentage of acidity of the two lots pasteurized on the day of delivery was .335; that of the lots of similar cream when pasteurized the next morning, .535. As a result of holding the cream in a large vat over night it developed an acidity of .2 per cent. higher. All lots were pasteurized at 182°F. To each was added about five per cent. culture (starter) after cooling.

The percentage of fat in the cream varied from .28 to .29; the churning temperature was 54 degrees F. for three lots and 55 degrees F. for one lot; the time required to churn varied from 16 to 45 minutes, the lots held over before pasteurizing, churned in less time than did the others; the percentage of fat in the buttermilk was practically the same for all lots, varying from .07 to .11; the temperature of the wash water for the butter was 56 degrees; the size of the churnings varied from 327 to 468 pounds each; all lots were churned in a "success" combined churn. The average score for flavor of the two lots pasteurized on the day of delivery was 43 out of a possible 50; that of the lots held over until next day before pasteurizing and then another day before churning was 41. There was not much difference in the lots in other respects so far as the quality of the butter is concerned.

Conclusions.

While the number of experiments is too few to draw hard and fast conclusions the evidence points to the following:

1. So far as pasteurizing and churning are concerned there was no difficulty experienced in handling similar cream which had developed a comparatively high acid before pasteurizing, nor did this high acid in the cream before heating cause any extra loss of fat in the buttermilk. This is all the more strange as we have usually found a rather heavy loss of fat in the buttermilk during hot weather, which we have attributed to the excessive acid in the cream at the time of pasteurization.

2. The flavor of the butter was apparently injured by holding the cream for so long a time before pasteurizing and churning. For best results in flavor of the butter, pasteurizing and churning ought to take place as soon as possible after the cream is separated.

The other qualities in the butter—grain and texture, color, and salting—do not seem to have been affected by the delay in heating and churning.

The Effect of Culture (Starter) on Raw and Pasteurized Cream for Buttermaking.

Four experiments were made during May to see the effects of a culture, varying in amount from 10 to 20 per cent., on similar cream raw, and pasteurized. In each experiment a given weight of cream was divided into four lots. One raw lot in each test was ripened naturally; the other raw lot with culture; one lot of pasteurized cream was allowed to ripen naturally; to the other, a culture was added. The percentage of fat in the cream varied from 24.5 to 30; the acidity of the raw cream varied from .35 to .46; and of the ripened cream from .34 to .63 being in every case highest in the raw cream lots to which culture had been added, and least in the pasteurized lots without culture—in fact, these lots usually showed slightly less acid at the time of churning than they contained before pasteurization took place; the lots were churned at temperatures ranging from 49 degrees F. to 54 degrees F.; the time required for churning, ranged from 17 to 115 minutes, being always least for the pasteurized lots and greatest for the raw cream lots; the percentage of fat in the buttermilk varied from .08 to .3, the highest test being found in a lot of raw cream without culture churned at 52 degrees F., in 20 minutes. The average tests of buttermilk fat of the raw, raw with culture, pasteurized, and pasteurized with culture lots, being, respectively, .205, .16, .202, and .177 per cent.

When we come to consider the quality of the butter, we find the order of merit in flavor to be, first, pasteurized without culture, which received an average score of 44.33 out of 50; pasteurized with culture added, 44; raw cream, with culture, 39.66; and raw cream without culture, 38.33.

The average total scores are also in the same order, being 93.33, 93., 88.66, and 87, respectively.

Conclusions.

1. Pasteurization of sour cream at 182 degrees stopped the further development of lactic acid, unless culture was added afterwards.

2. The lots of cream pasteurized, both with and without culture, churned in less time than did the raw cream lots.

3. In these experiments there was little difference in the fat lost in the buttermilk, by churning raw cream or pasteurized lots.

4. The quality of the butter made from the pasteurized cream, was superior.

I am under obligations to the instructors of the Dairy School, the Chemical and Bacteriological Departments of the College, the Cheese Instructors for Western Ontario, particularly to Mr. Frank Herns, Chief Instructor, for assistance in scoring experimental cheese, and to Miss Sparrow, stenographer and book-keeper, all of whom have assisted in making the work of the year helpful, we hope, to the great dairy industry of the Province of Ontario.

Yours respectfully,

H. H. DEAN.

PART IX.

THE PROFESSOR OF ANIMAL HUSBANDRY AND FARM SUPERINTENDENT.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith the report of my department for the year 1910.

FARM DEPARTMENT.

The past season has been a fairly satisfactory one in the case of most crops grown in the Farm Department.

Hay, on the whole, was a fair crop, averaging a little over two tons per acre.

Winter Wheat, of which we had twenty-one acres, was a heavy crop, especially nine acres on summer fallow. All the wheat is not threshed, but judging from what we have threshed the yield will run over forty bushels per acre all round.

Barley was not up to our usual standard, and the yield is about thirty-five bushels per acre. The crop seemed to ripen too soon and the sample is not good.

Oats were a fair crop and seventy acres of oats averaged close to fifty bushels per acre.

Corn, of which we had thirty-two acres, yielded fairly well, but owing to the fact that some twenty acres of it had to be planted a second time, it was rather late and did not mature so well as one would wish. The yield is about fourteen tons per acre.

Potatoes were an excellent crop, but were rather badly affected with rot. Our eight acres of potatoes averaged a little over two hundred and fifty bushels per acre, and a great many potatoes were left on the ground, owing to the rot.

Mangels were an exceptionally heavy crop, yielding very close to eleven hundred and fifty bushels per acre.

Turnips were also good, yielding about eight hundred bushels per acre.

LIVE STOCK.

In connection with the live stock, I would like again to respectfully urge the importance of building a new dairy stable. The present dairy stable is antiquated and unsanitary, and it is high time that steps were taken to improve the accommodation for our dairy herd.

I would also call attention to the importance of the horse industry in this Province, and to the fact that we are unable to do anything in horse breeding worth speaking of at this institution owing to lack of accommodation.

At present we are carrying a heavy stock of animals of different kinds.

In horses we have only three pure-bred Clydesdale mares, but our working horses, together with the horses used in other departments and which are maintained by the Farm Department, make a total of twenty-seven head.

In cattle we are carrying the following stock, the numbers representing all animals, large and small:

Shorthorns	30 head.	Experimental Steers	9 head.
Aberdeen-Angus	5 "	Holsteins	22 "
Herefords	5 "	Ayrshires	24 "
Grades and Crosses	16 "	Jerseys	14 "

In sheep we have the following:

Shropshires	20 head.	Oxfords	7 head.
Leicesters	12 "	Cross-breds	6 "

In swine we have the following, not counting this fall's pigs:

Yorkshires	36	Berkshires	10
Tamworths	12		

From the above figures, it will be seen that we are carrying a heavy stock for the amount of arable land in the Farm department.

The Dairy Herd.

Following is the record of the herd for the past year:

Cow.	Breed.	Age, Nov. 1, 1909.	Number days milking.	Lbs. milk.	Average per cent. fat in milk.	Lbs. fat in milk.	Lbs. butter adding ⅛ to fat.	Value fat, 25c. per lb.	Cost of feed.	Profit over cost of feed.
								$ c.	$ c.	$ c.
Boutsje	H	7	365	17,173	3.43	589.23	687.43	147.31	72.49	74.82
Blackie	G	7	304	11,145	3.5	388.05	452.72	97.01	54.47	42.54
Mercena N	H	5	356	12,320	3.1	382.18	445.87	95.54	65.01	30.53
Rose	A	6	305	7,559	4.4	332.02	387.35	83.00	46.99	36.01
Ramona	J	8	343	7,670	4.2	324.29	378.34	81.07	46.68	34.39
Lady S.	H	6	305	10,209	3.1	322.22	375.92	80.55	56.38	24.17
Tibbie	A	4	323	7,529	4.2	316.95	369.77	79.24	45.80	33.44
Lady Nancie	A	9	334	8,100	3.9	315.22	367.75	78.80	39.68	39.12
Margaret	H	4	323	9,267	3.4	315.03	367.53	78.76	55.46	23.30
Beauty	H	5	267	9,676	3.24	313.44	365.68	78.36	55.74	22.62
Molly N.	H	5	297	8,692	3.4	296.75	346.21	74.19	52.44	21.75
Minnie	A	5	287	8,437	3.5	296.47	345.88	74.12	52.55	21.57
Dreamy	J	5	322	6,005	4.8	292.39	341.12	73.09	45.41	27.68
Aggie	J	8	335	5,366	5.2	281.56	328.48	70.39	37.79	32.60
Abby M	H	4	286	8,558	3.28	280.58	327.34	70.14	47.48	22.66
Dolly	J	7	267	6,476	4.3	280.55	327.31	70.14	39.27	30.87
Inka M	H	10	307	9,245	3.03	280.48	327.22	70.12	54.08	16.04
Toitilla	H	8	227	7,370	3.54	261.06	304.57	65.26	38.57	26.69
May Queen	A	8	275	7,123	3.6	259.96	303.28	64.99	45.21	19.78
Bud	A	6	187	6,406	4.0	252.38	294.44	63.09	17.76	45.33
Queenie	J	11	328	4,761	5.2	250.24	291.94	62.56	40.56	22.00
Whitey	G	8	253	6,889	3.4	236.62	276.06	59.15	37.04	22.11
Denty	A	11	186	6,030	3.9	234.56	273.65	58.64	42.45	16.19
Molly de K.	H	8	182	6,571	3.44	226.29	264.00	56.57	40.40	16.17
Buttercup	J	13	293	4,207	5.0	212.13	247.48	53.03	38.88	14.15
Dainty	A	10	161	5,118	3.9	202.25	235.96	50.56	38.11	12.45
Molly Rue	H	1	187	5,070	3.3	170.19	198.55	42.54	27.62	14.92
Mercena R.	H	1	197	4,580	3.5	159.86	186.50	39.96	29.70	10.26
Floss	A	4	187	3,958	3.7	148.74	173.53	37.18	18.42	18.76
Rose	H	4	187	4,331	3.4	146.75	171.21	36.69	16.99	19.70
Cherry	A	2	187	3,919	3.7	145.86	170,17	36.46	17.26	19.20

In connection with the herd record, the following points should be noted:

(1.) In the column denoting breed, A stands for Ayrshire, H for Holstein, J for Jersey, and G for Grade, and the cows are ranked in order of production of butter fat.

(2.) The food consumed by each cow was not weighed every day, but occasional weighings were made so that the estimate given in the table is a close approximation.

(3.) Foods have been valued as follows: Meal, including bran, $20.00 per ton; Oil cake, $32.00 per ton; Hay, $8.00 per ton; Roots, $2.00 per ton; and silage, $2.00 per ton. Pasture is valued at $1.00 per cow, per month. The value attached to meal and oil cake is somewhat below actual market values, but we have retained the values used for several years back, so as to make our results comparable one with another.

Summary of Herd Record.

The following table shows a summary of the dairy herd grouped into breeds:

Breed.	No. of cows.	Average No. days milking.	Average lbs. milk.	Average lbs. fat.	Average lbs. of butter adding $\frac{1}{6}$ to fat.	Average value of fat at 25c. per lb.	Average cost of feed.	Average profit.
Holstein	12	275	9,065	299.77	349.73	$74.94	$49.61	$25.33
Ayrshire.....	11	238	6,288	241.01	281.18	60.25	34.66	25.59
Jersey	6	314	5,747	273.52	319.10	68.38	41.43	26.95
Grades	2	278	9,017	312.33	364.36	78.08	45.75	32.58
Average of Herd.	31	276	7,411	274.65	320.39	$68.66	$42.47	$26.19

It will be noted that the two grade cows have given the highest average profit per head. One of these cows, however, is a particularly large producer, and since there are only two cows of this class it has given the grades an advantage. Jerseys come next and the Ayrshires are ahead of the Holsteins. The latter comparison, however, is scarcely fair, because six of these Ayrshire cows were purchased in the early spring, just before the cows went to pasture, so that they have the full advantage of cheap summer feeding and very little expensive winter feeding is charged against them. If it were not for this, the Holsteins would be ahead of the Ayrshires. Comparisons of this kind, however, are not conclusive evidence that one breed excels the other as a breed, but the table is of interest as showing what the representatives of each breed did in our herd, and this is as far as the comparison should be carried.

Sheep.

In sheep, small flocks of Border Leicesters, Oxfords, and Shropshires are maintained. During the winter of 1909-10, we fed our breeding ewes on second crop alfalfa and turnips, practically no grain being fed before the lambs came. The ewes came through in exceptionally good condition, being fat and healthy in the spring. It will be of interest to compare the yield of wool and the lamb crop of 1910, with that of 1909. During the winter of 1908-09 the ewes were fed mixed timothy and clover hay, turnips, and a light grain ration.

The following table shows the yield of wool of each breed for 1909 and 1910.

Breed.	Average weight of unwashed wool per head.		Per cent. increase 1910 over 1909.
	1909. Timothy and clover.	1910. Alfalfa.	
Leicester	9.14 lbs.	9.67 lbs.	5.8 per cent.
Shropshire	9.30 "	9.47 "	1.8 " "
Oxford	9.57 "	10.35 "	8.1 " "
Average all breeds	9.34 lbs.	9.83 lbs.	5.2 per cent.

There were a few changes in the flock between 1909, and 1910, but most of the sheep were on hand both years, the changes being very slight. The fact that there was an increase in the yield of wool for each breed, speaks well for alfalfa hay as a sheep food.

The lamb crop of 1910, was also much more satisfactory than that of 1909. The following table shows the number of ewes of each breed, the number of lambs produced, the number of lambs saved, and the per cent. of increase in the flock for the years 1909 and 1910:

Breed.	1909.				1910.			
	No. of ewes.	No. of lambs.	No. of lambs saved.	Per cent. of increase in flock.	No. of ewes	No. of lambs.	No. of lambs saved.	Per cent. of increase in flock.
Leicester	6	9	9	150	7	8	8	114
Shropshire	17	27	18	106	21	35	32	152
Oxford	8	14	11	137	7	12	11	157
Total	31	50	38	122	35	55	51	146

Per cent. of lambs lost: In spring 1909, 24 per cent. In 1910, 9 per cent.

Perhaps it would be too much to claim that the great difference in favor of the lamb crop of 1910, was due entirely to the feed, but the satisfactory results of this year indicate that alfalfa hay is a most excellent food for sheep.

Cost of Raising Lambs.

In the spring of 1910, seven ewes, which had been bred to the Shropshire ram, gave birth to 10 lambs between March 1st and 5th, and a record has been kept of the food consumed by the ewes and lambs.

Following is the food consumed by seven ewes and ten lambs from time of lambing until May 3rd, when they were turned out to pasture. As previously stated, the first lambs were dropped on March 1st and the last on March 5th.

Oats, 560 lbs. at 40c. per bu.	$6 59
Bran, 224 lbs. at $20.00 per ton	2 24
Oil cake, 196 lbs. at $36.00 per ton	3 58
Roots, 1,648 lbs. at 10c. per bu.	2 75
Alfalfa, 1,120 lbs. at $8.00 per ton	4 48
Total	$19 64

To arrive at the total cost of the lambs, we must charge all food consumed by the ewes during the year, and add charge for service fees. The complete statement of charges, therefore, would be as follows:

Hay, 1,680 lbs. at $8.00 per ton	$6 62
Roots, 2,250 lbs. at 10c. per bu.	4 20
Oats, 105 lbs. at 40c. per bu.	1 23
Bran, 105 lbs. at $20.00 per ton	1 05
Total	$13 10
Pasture, 7 ewes, May 1 to Nov. 1, at 25c. per month	$10 50
Service fees, 7 ewes at 50c.	3 50
Value of food consumed by 7 ewes and 10 lambs, as previously shown	19 64
Total charges	$46 74

Against these charges must be credited the wool produced by the ewes, which was as follows:

41 lbs. unwashed medium wool at 15½c.	$6 35
19 lbs. unwashed coarse wool at 13½c.	2 56
	$8 91

The net cost, therefore, was as follows:

Total charges	$46 74
Less value of wool	8 91
Net cost of 10 lambs	37 83
Net cost per lamb, 2 months old	3 78

The total weight of the ten lambs on May 3rd, when they were approximately two months old, was 552 pounds, so that the average cost per pound at this age was, 6.85c., which is less than half of what the lambs could have been sold for at that time.

In the calculation of cost, risk, interest, and labor have been left out of consideration.

If the foods consumed by these sheep were charged at the actual cost of production upon a reasonably good farm, the cost would be very greatly reduced.

Cost of Lambs in Fall.

Of the ten lambs mentioned in the preceding calculation, five were pure-bred Shropshires, and have been dropped from the experiment. The remaining five lambs are cross-breds, three of them out of Oxford ewes, two of them out of

Leicester ewes, and all by a Shropshire ram. These five lambs were on pasture May 3rd with the ewes, and had nothing but pasture until October 15th, when they were taken into the pens and put upon feed. Weights are taken at 30 day periods, so that this report takes them only up to November 14th.

The food consumed during this 30 day period was as follows:

Oats, 157 lbs. at 40c. per bu.	$1 85
Oil cake, 78 lbs. at $36.00 per ton	1 40
Bran, 40 lbs. at $20.00 per ton	40
Hay, 285 lbs. at $8.00 per ton	1 12
Roots, 750 lbs. at 10c. per bushel	1 25
Cost of food for 30 days	$6 02

To this must be added as follows:

Cost of 5 lambs, 2 months old, at $3.78	$18 90
Pasture, 5½ months, at 20c. per lamb per month	5 50
Total cost to Nov. 14th	$30 42

Total weight of lambs, Nov. 14th, 664 lbs.
Total cost per 100 lbs., $4.58.

These lambs could have been fed more cheaply during the 30 day period in the pens, but we were anxious to push them along rapidly to have them ready for class room work, and fed them a heavy meal ration in consequence.

Everything considered, we must admit that these lambs have given a good account of the food they have consumed.

The following table shows the weights and gains made by the five cross-bred lambs at different stages:

Ear label of lamb.	Weight at 1 Week Old. (Average date March 10.)	Weight, May 11th. (8 days on pasture).	Weight, Oct. 15th. (Brought into Pens.)	Weight, Nov. 14th.
1864 (single)	18 lbs.	70 lbs.	136 lbs.	154 lbs.
1865 (single)	21 "	66 "	130 "	144 "
1866½ (twin)	13 "	58 "	108 "	116 "
1867 (twin)	13 "	51 "	95 "	105 "
1868 (single)	17 "	58 "	124 "	145 "
Totals	82 "	303 "	593 "	664 "

Average daily gain per lamb before going to pasture	.71 lb.
" " " on pasture	.37 lb.
" " " in pen on full feed	.47 lb.

It will be noted that the best gains were made while the lambs were very young, and before going to pasture.

The gains on pasture are very fair, in spite of the fact that for a time the pasture was anything but good.

After coming into the pen, the lambs made very satisfactory gains, but not equal to their first gains.

EXPERIMENTS WITH SWINE.

Cost of Raising Pigs.

In the spring of 1910, we had nine breeding sows, six Yorkshires, two Berkshires, and one Tamworth.

The first sow farrowed on April 13th, and the last one on June 22nd.

The pigs were weaned at six weeks old, except the last litter, which were weaned on July 28th, the pigs being only five weeks old.

A record was kept of all food consumed by sows and pigs from the time each sow farrowed, until July 28th, when the last litter was weaned.

The nine sows raised 72 pigs, and the average age of the pigs on July 28th was 79 days, or, approximately, 11 weeks.

Taking in each sow when she farrowed, and carrying her and her pigs along until July 28th, we found that the sows and their pigs together consumed the following quantities of food, which have been valued at what we regard fair market values:.

Wheat Middlings, 5,030 lbs. at $22.00 per ton	$55 33
Barley, 2,965 lbs. at $22.00 per ton	32 62
Oil Cake, 250 lbs. at $38.00 per ton	4 75
Skim Milk, 17,016 lbs. at 20c. per cwt.	34 05
	$126 75

Therefore, the total value of food consumed by sows and pigs from the time the pigs were born until the last litter was weaned, amounted to $126.75.

Maintenance of Dry Sow. To arrive at the total cost of the pigs, we must make a charge for maintaining the sow after her pigs are weaned, and before she produces her next litter. In previous calculations, we estimated the cost of maintaining a dry sow at 75 cents per month. Lest this estimate be regarded as too low under present conditions, we shall place it at $1.00 per month. If a sow raises two litters per year, and nurses each litter six weeks, there will be left about 9¼ months each year between litters, which, at $1.00 per month, amounts to $9.25. Only half of this amount, or $4.63, should be charged against any one litter.

Interest, Risk, Labor, and Manure. These are controversial points, and the allowance which should be made for each is difficult to estimate. In the meantime, therefore, we shall leave these items out of consideration.

Total Cost of Pigs. It has been stated that the average age of the 72 pigs was 11 weeks when this part of the experiment closed. The cost, therefore, of these 72 pigs at 11 weeks old, omitting risk, interest, labor, and manure, was as follows:

Service fees, 9 sows at $1.00	$9 00
Maintenance of dry sows, 9 sows at $4.63	41 67
Value of food consumed by sows and litters (average age of litters, 11 weeks)	126 75
Total cost of 72 pigs	$177 42
Average cost of 1 pig 11 weeks old, omitting risk, interest, labor and manure	$2 46

Notes.

In 1906, with 12 sows, we found that on an average a pig six weeks old cost us $1.27. This year we charged higher prices for food than we did in 1906,

so that a cost of $2.46 for a pig 11 weeks old is a better record than that of 1906. The improvement is due mainly to the fact that our sows raised larger litters this year.

An average of 8 pigs per litter for 9 sows is more than can be ordinarily expected, but where only one or two sows are kept, 8 pigs to a litter is not an unreasonable expectation.

Alfalfa, Skim Milk and Pasture.

As soon as the last of the young pigs described in the preceding article were weaned, 40 out of the 72 pigs were divided into five groups of eight pigs each, and used for another test.

Lot I. was fed meal alone, in pen.

Lot II. was turned into a small alfalfa pasture, and fed the same meal ration as Lot I.

Lot III. was kept in a pen and fed the same meal ration as Lot I., but green alfalfa was fed in addition, the pigs being given as much green alfalfa each day as they would eat. On an average, the pigs ate slightly more than a pound of green alfalfa each, per day.

Lot IV. was kept in a pen, and fed the same meal ration as Lot I., with skim milk in addition. The pigs received about 2 pounds of skim milk for each pound of meal.

Lot V. was kept in a pen, and fed the same ration as Lot IV. with what green alfalfa the pigs would eat in addition. These pigs ate less than a pound of green alfalfa each, per day.

The test lasted 90 days.

During the first 30 days the meal ration consisted of 1 part ground barley to 2 parts wheat middlings, and during the remainder of the time it consisted of equal parts of ground barley and wheat middlings.

The following table shows results:

Table Showing Weights, Gains, and Food Consumed.

——	Lot I. Meal only. In pens. 8 pigs.	Lot II. Meal and alfalfa pasture. 8 pigs.	Lot III. Meal and gre'n alfalfa. In pens. 8 pigs.	Lot IV. Meal and skim milk. In pens. 8 pigs.	Lot V. Meal, skim milk and gre'n alfalfa. In pens. 8 pigs.
Duration of test	90 days.	90 days.	90 days.	90 days.	90 days.
Total weight of hogs at beginning of test	628 lbs.	563 lbs.	648 lbs.	567 lbs.	512 lbs.
Total weight of hogs at close of test	1,399 lbs.	1,287 lbs.	1,463 lbs.	1,535 lbs.	1,495 lbs.
Total increase in live weight	771 lbs.	724 lbs.	815 lbs.	968 lbs.	983 lbs.
Daily increase per pig	1.07 lbs.	1.00 lbs.	1.13 lb.	1.34 lbs.	1.36 lbs.
Total food consumed:					
Meal	2,737 lbs.	2,681 lbs.	2,699 lbs.	2,645 lbs.	2,463 lbs.
Alfalfa	.....	.....	836 lbs.	.....	631 lbs.
Milk	.....	.....	.....	5,380 lbs.	5,380 lbs.
Food consumed per 100 lbs. increase in weight:					
Meal	355 lbs.	370.3 lbs.	331.16 lbs.	273.2 lbs.	250.5 lbs.
Alfalfa	.....	.....	102.6 lbs.	.....	64.2 lbs.
Milk	.....	.....	.....	555.8 lbs.	547.3 lbs.

Notes on Results.

1. A noticeable feature of the table is the low meal requirement for 100 pounds increase in weight in all lots.

2. Feeding on pasture proved the least economical of the methods used in this comparison. It is true that the pasture was not the best, but that these hogs should require more meal for 100 pounds increase in weight than those fed meal alone, in pens, will be a surprise to many, though it is in harmony with previous results from pasturing hogs at this institution.

3. Feeding green alfalfa with meal to hogs in pens gave excellent results, as may be seen by comparing Lots I and III.

4. Skim milk and meal gave large returns, but the combination of skim milk, alfalfa and meal gave the largest returns.

5. The improvement in the ration effected by adding alfalfa or skim milk is strong evidence of the importance of giving hogs variety in their ration.

6. In this test we find, by comparing Lot I, which is a check group, with Lots III and IV, that:

(*a*) 1 lb. meal is equal to 4.3 lbs. green alfalfa.

(*b*) 1 lb. meal is equal to 6.79 lbs. skim milk.

This is a remarkable showing for alfalfa, and it indicates great possibilities for this crop as a means of reducing the cost of producing pork when fed with a meal ration. Our results with alfalfa are not extreme when compared with those from some other experiment stations. For example, the Kansas Experiment Station found that when green alfalfa was fed as a supplemental food with corn to hogs, 170 lbs. of green alfalfa were equal in feeding value to 100 lbs. of corn, which is more than twice the value for alfalfa found in our trial. Further, if we multiply the digestible constituents in green alfalfa by 4.3 (the number of pounds of alfalfa shown to be equal to 1 lb. of meal), we get a very close approximation to the digestible constituents in the meal ration which we used.

Skim milk makes a rather poor showing, due, no doubt, to the fact that the pigs in Lot I, which were fed meal alone, made a remarkably economical gain. This same fact would also tell against the showing made by alfalfa, and it is suggestive that the relation shown between alfalfa and skim milk comes fairly close to their relative amounts of digestible nutrients, 6.79 lbs. of skim milk containing more protein than 4.3 lbs. of green alfalfa, but considerably less carbohydrates.

7. Lot V is also a check group, and if we substitute the meal value of alfalfa, as shown by our previous calculation, for the alfalfa consumed by Lot V, it shows that Lot V consumed the equivalent of 265.4 lbs. meal and 547.3 lbs. milk for 100 lbs. increase in weight. This corresponds fairly closely with the results obtained in Lot IV, which required 273.2 lbs. meal and 555.8 lbs. milk for 100 lbs. increase, but it indicates that the value of alfalfa has been, if anything, underestimated.

On the other hand, if we substitute the meal value of skim milk, as shown by our first calculation, for the skim milk consumed by Lot V, it shows that Lot V consumed the equivalent of 331.1 lbs. meal and 64.2 lbs. alfalfa for 100 lbs. increase in weight, while Lot III consumed 331.16 lbs. meal and 102.6 lbs. alfalfa for 100 lbs. increase, a very close agreement of results.

There is still another way of checking results, and that is to substitute their meal value for both the alfalfa and skim milk consumed by Lot V, and compare the result with Lot I. If we do this, we find that Lot V consumed a total meal equivalent of 346 lbs. for each 100 lbs. increase in weight, whereas Lot I consumed

355 lbs. meal for 100 lbs. increase. Here, again, is a fairly close agreement of figures, but the result would indicate that the pigs which received the mixed ration made rather better use of the meal they consumed.

8. Green alfalfa cannot be used in as large quantities as skim milk, but it can be grown so cheaply that it can be used to much better advantage than skim milk for pigs over three months old, even if skim milk can be bought at 10 cents per hundredweight.

9. The alfalfa used in this test was second and third growth of good quality, which is more suitable for pigs than the first cutting.

Returns for Food Consumed by Hogs.

In the College Report for 1907 there is a table showing the prices yielded for food consumed by 297 hogs, at various selling prices per pound live weight for the hogs. The table shows that if the hogs were sold at:

(*a*) 5c. per lb., they would give $23.87 per ton for meal, 20c. per cwt. for milk, and 10c. per bushel for roots.

(*b*) 6c. per lb.; $30.71 for meal, 20c. for milk, and 10c. for roots.

(*c*) 7c. per lb.; $37.55 for meal, 20c. for milk, and 10c. for roots.

Regarding the hogs used in this year's test, it has been shown that, at 11 weeks old, they cost us $2.46 each, omitting the items of interest, risk, labor, and manure. However, since we selected the best 40 pigs out of 72 for our test with alfalfa, milk, etc., and since no charge was made for interest, risk, or labor, we shall charge the pigs used in this calculation at $5.00 each instead of $2.46. We are also charging 20c. per cwt. for milk, and $3.00 per ton for green alfalfa. Whatever is left, therefore, after deducting the cost of the pigs at 11 weeks old and the value of the milk and alfalfa, from the value of the pigs when marketed, will represent the cash received for the meal consumed. The amount to be deducted from the selling price is as follows:

40 pigs at $5.00 each	$200 00
10,760 lbs. skim milk at 20c. per cwt.	21 52
1,467 lbs. green alfalfa at $3.00 per ton	2 20
Total	$223 72

The following table shows the prices which would be realized for foods consumed by these hogs had they been sold at 5c. per lb., 6c. per lb., 7c. per lb., and 8c. per lb. live weight.

Assumed selling price of hogs, live weight.	Price received per ton for meal.	Price received per cwt. for skim milk.	Price received per ton for green alfalfa.
If sold at 5c. per lb.	$20 45	20c.	$3.00
If sold at 6c. per lb.	31 30	20c.	3.00
If sold at 7c. per lb.	42 16	20c.	3.00
If sold at 8c. per lb.	53 00	20c.	3.00

It is of interest to note that the results agree fairly well with those reported in 1907.

These results also show that the hog is able to give a good account of the food he consumes when he is sold at 6c. or more per pound.

Respectfully submitted,

G. E. DAY.

PART X.

THE PROFESSOR OF POMOLOGY.

To the President of the Ontario Agricultural College:

SIR,—I beg to submit herewith the first annual report of the Department of Pomology:—

Mr. A. McMeans, who was for four years in charge of our vegetable gardens, resigned on April 1st, to accept a position in North Dakota, and Mr. A. H. MacLennan, B.S.A., was appointed to the vacancy on June 1st.

MEETINGS ATTENDED.

Fruit Institute meetings were attended and addresses were given at the following places: Whitby, Oshawa, Georgetown, Coldstream, Simcoe, Jordan, Grantham, Burlington.

In addition, addresses were also presented at the 16th annual meeting of the International Apple Shippers' Association, held at Niagara Falls, N.Y.. Aug. 3, 4, and 5th; the annual convention of the Ontario Vegetable Growers' Association, London, Ont., September 14th; the annual convention of the New Brunswick Fruit Growers' Association, St. John, N.B., Oct. 1st and Nov. 1, 2, and 3. It was my privilege to assist in placing the awards in several classes at the New Brunswick Apple Show, also held in St. John on these dates.

ORCHARD SURVEYS.

The exhaustive studies of orchard conditions begun last year in conjunction with the Fruit Branch, Department of Agriculture, Toronto, were continued this season. Messrs. P. E. French and H. K. Revell spent the entire summer in an orchard-to-orchard canvass of the County of Northumberland; Mr. W. H. Robertson was stationed in Prince Edward County and collected most useful information on apple growing, as well as on the production of vegetable crops for the canning factory.

Messrs. F. M. Clement and Vernon King concluded the survey of the Niagara Fruit Belt, begun last year by Mr W. D. Jackson. Complete reports of this excellent work are being made to P. W. Hodgetts, Director, Fruit Branch, Department of Agriculture, and will be distributed from the Department at Toronto.

SHORT COURSE.

The third annual Short Course in Fruit Growing was held from January 25th to February 5th, and was a pronounced success. The number in attendance was one hundred and twenty, and the lectures and instruction given were of a high order. We wish to extend to Messrs. W. T. Macoun, Dominion Horticulturist, Central Experimental Farm, Ottawa; H. Jones, Maitland; R. R. Sloan, Blyth; W. D. Albright, London; W. H. French, Oshawa; Frank Shearer, Vittoria; Elmer Lick, Oshawa; W. H. Bunting, St. Catharines, and to others who assisted, our thanks for their valued services.

Academic.

It is gratifying to note that increasing numbers of regular course students are interesting themselves in fruit-growing and vegetable-gardening. Awakening interest in these subjects is plainly perceptible in many sections of the Province and our students are evidently anxious to keep abreast of the times.

Interesting and very profitable excursions were made this fall with the present graduating class in Horticulture—nine in number— through the Niagara Fruit Belt and to the County of Norfolk, noted for its apples.

Spraying.

For an account of tests made with various spraying materials and methods of spraying, see the Report of the Professor of Entomology.

Orchard Management.

Cover crops were sown in the apple orchard, June 25th, three weeks earlier than usual. Previous to that date the trees had made very strong growth, due no doubt to continued use for several years past of legumes as covers and also to the fact that the entire orchard has recently had a moderate application of barnyard manure. It was feared that if cultivation were continued until July 15th—the customary date—growth would become excessive, and that trees would consequently be in danger of going into winter in a soft, unripened condition. The effects of this early seeding were very noticeable and are worthy of mention:—

1. The desired degree of maturity of the wood has been attained. Practically all of the eighty varieties stopped growing in time to mature perfectly before winter, and in no case did serious second growth take place, although autumn conditions were decidedly favorable for vegetation.

2. Earlier maturity of wood was accompanied by higher color of fruit, and this effect was so strongly in evidence as to be really remarkable. In previous years considerable difficulty has been experienced in this respect, especially with late varieties such as Northern Spy, and although some varieties were noticeably smaller in size this year than formerly, we feel that the general improvement in color more than makes amends for any falling off in quantity due to smaller size of fruit.

Most of the orchard was this season sown to buckwheat, which matured early in the fall but was not cut. The ripened grain furnished sustenance for some weeks for several hundred chickens, which occupied colony houses located among the trees. Many fruit growers would have criticized us for allowing this splendid crop of grain to "go to waste," in fact, some have already done so. Our reasons for allowing the entire crop to rot on the ground lie in the belief that the fertilizing constituents contained are of more value to the trees than the crop would be worth if sold off the farm in the form of straw or grain. The straw and grain are probably more valuable as humus, too, than they are as fertilizers, for it is well known that humus constitutes one of the chief constituents of a fertile soil. It is doubtful if the majority of our growers place enough value on this particular phase of the usefulness of cover crops.

Winter rye was sown from a wagon, broadcast, among the ripened buckwheat and the latter was then rolled flat with an ordinary roller. The rye germinated nicely and made a small amount of growth before winter set in. The orchard

will be plowed as early in spring as possible, and the rye, which will by that time have made still more growth, will add very materially to the quantity of humus supplied by the buckwheat.

Variety Tests of Currants.

The following table gives yields of white, red and black currants for the five years, 1904 to 1908, inclusive. Most of these are new varieties upon which we have never reported previously.

White Currants.

Variety.	Average yield per plant per year, in ounces.
White Imperial	39.5
White Grape	38.8
Cleopatra	15.1

Red Currants.

Raby Castle	58.0
Red Cross	54.1
Red Dutch	52.1
London Red	50.0
Greenfield	49.0
New Victoria	48.6
Red Victoria	45.1
Red Grape	42.6
Fay	39.0
Brayley	37.1
Porter's Prolific	36.3
La Conde	33.6
Porter's Foundling	32.9
Pomona	30.6
Wilder	30.5
Belle de Ste. Giles	29.8
North Star	29.5
Cherry	27.3
Prince Albert	24.0
Moore's Ruby	23.1
La Versailles	20.0
Fertile de Angus	10.1

Black Currants.

Climax	23.5
Prince of Wales	23.1
Naples	22.3
Collin's Prolific	20.0
Beauty	19.8
Beauty No. 7	19.5
Saunders	18.8
Champion	17.8
Dominion	17.3
Black English	17.0
Black Victoria	16.6
Star	15.3
Ogden	15.1
Monarch	14.1
Clipper	12.5
Lees	11.8
Standard	11.0
African	11.0
Winona	8.6
Success	7.8
Charmer	7.1

Strawberries.

The following table shows results secured in spacing strawberry runners by hand instead of allowing them to find their places naturally:—

Row No. 1.	*Row No. 2.*
Runners hand-layered:	Runners layered naturally:
29 lbs., 3¼ ozs.	14 lbs., 11¾ ozs.

The figures given represent the yields for thirty feet of measured row. Plants were set at eighteen inches in the row, with rows four feet apart. Runners were spaced to six inches in the case of Row No. 1, and evenly distributed around the parent plant to a total width of fifteen inches. A large number of surplus runners were removed entirely. Row No. 2 was somewhat wider than Row No. 1 and, of course, contained a much larger number of plants.

It will be noted that these yields are at the rate of 10,600 pounds of fruit per acre from the plants spaced by hand, and 5,348 pounds per acre from those which were allowed to form runners without interference—a difference of 5,242 pounds per acre in favor of the former. The variety was Parson's Beauty. The

specific reason for the great difference in yield lies, no doubt, in the fact that the season was particularly dry, and the conclusion to be drawn is that crowded plants suffer much more under such conditions than those not crowded. In order to prepare for seasons like 1910, it would most certainly pay to take the extra time necessary in preventing overcrowding of plants in the row.

List of Recommended Varieties of Fruit.

The following are the results of the extensive variety tests which have been carried on here during the past fifteen years:

Apples.—*Commercial:* Duchess, Alexander, Wealthy, Snow, McIntosh.
Domestic: Yellow Transparent, Astrachan, Duchess, Alexander, Wealthy, Trenton, Colvert, McMahon White, Snow, McIntosh, Bellflower, Crime's Golden, Tolman, Golden Russet, Spy.
Crabs: Whitney, Transcendant, Martha, Hyslop.

Cherries.—*Sour:* Richmond, Montmorency.

Pears.—Clapp, Seckel, Flemish, Sheldon.

Plums.—Bradshaw, Imperial Gage, Shipper's Pride, Lombard, Reine Claude, Glass.

Grapes.—*Black:* Moore's Early.
Red: Moyer.
White: Winchell.

Currants.—*Black:* Victoria, Saunders, Champion, Naples.
Red: Red Cross, Red Victoria, Fay.
White: White Grape.

Gooseberries.—*American:* Red Jacket, Pearl.
English: Whitesmith, Industry.

Raspberries.—*Black:* Older, Smith's Giant.
Red: Marlboro, Herbert, Cuthbert.
Purple: Columbian.
White: Golden Queen.

Strawberries.—*Commercial:* Bederwood (P.), Splendid (P.), Warfield (Imp.), not suited to light soils; Parson's Beauty (P.).
Domestic: Bederwood (P.), Splendid (P.), Dunlap (P.), King Edward (P.), Warfield (Imp.), Glen Mary (P.), Williams (P.).

The following notes on the vegetable work of the season have been prepared by Mr. MacLennan:—

Report on Vegetable Work, 1910.

The early part of the season was very unfavorable, the spring being cold and damp. The latter part of May and nearly all of June was very dry and hot. The balance of the season was, however, quite favorable to vegetable growth and all late crops were decidedly good.

Irrigation.

Further experiments were conducted this year with the Skinner overhead system of irrigation. Following are tabulated results with lettuce, each row being twenty-five feet long.

Lettuce.	Date sown.	Date harvested.		Irrigated weight.	Non-irrigated weight.
		Irrigated.	Non-irrigated.		
Leaf.....	May 13	June 22	July 4	20 lbs. 5 oz.	11 lbs. 3 oz.
Head	May 13	July 10	July 26	26 lbs. 15 oz.	9 lbs. 1 oz.
Cos.....	May 13	June 28	July 10	16 lbs. 3 oz.	5 lbs. 9 oz.

The quality of the irrigated lettuce was excellent, while that of the non-irrigated was decidedly inferior owing to bitterness developed under the very hot and dry conditions. The non-irrigated plants remained in edible condition only a short time and began showing seed stalks at a very early date. The irrigated plants were not only ready for use considerably earlier (as will be noted by reference to the table above), but it seemed to be comparatively easy to hold them in good condition for a considerable time. These results go to show that in times of drought, artificial systems of irrigation may prove of the very greatest value to the market grower. We hope to be able to extend our irrigation system and to do considerably more experimental work.

Seed Growing.

We have had under way for some years improvement work in cabbage, tomatoes, sweet corn, and onions. This work was undertaken primarily with the object in mind of obtaining improved strains of choice varieties, and in addition to the results secured in this direction it has served to point out the possibilities there might be in commercial seed growing in this country. We have therefore extended the work somewhat, and this year have successfully harvested seed crops of lettuce, radish, beet and parsnip.

With the co-operation of the Canadian Canners, Limited, we are attempting, through selection, to develop heavier cropping strains of the following canning peas: Alaska, Advancer, Glory, and Horsford's Market Garden.

List of Vegetables Recommended for Outdoor Culture.

Asparagus.—Palmetto, Conover's Colossal, Argenteuil.

Parsley.—New XXX, Champion Moss Curled.

Brussels Sprouts.—Long Island Improved.

Beans.—*Green Pod:* German Stringless, Giant Green Pod Valentine.
Wax Pod: Keeney's Rustless, Davis Wax, Detroit White Wax.

Beets.—Egyptian, Detroit Red, Fireball, Black Red Ball.

Carrots.—Chantenay, Rubicon, Half Long Scarlet Nantes.

Cabbage.—*Early:* Jersey Wakefield.
Medium: All Head, All Seasons, Early Summer.
Late: Danish Ball Head, Flat Dutch, Houser (exceptionally free from Black Rot).
Red: Mammoth Red, Black Diamond.

Celery.—*Early:* White Plume, Golden Self Blanching.
Medium: Chicago Giant Self Blanching, Paris Golden.
Late: Evan's Triumph, Giant Pascal.

CAULIFLOWER.—Early Erfurt, Snowball.

ONIONS.—*Yellow:* Globe Danvers, Southport Yellow Globe, Prizetaker.
Red: Wethersfield, Southport Red Globe.
White: Southport White Globe.
CUCUMBERS.—Davis' Perfect, Klondike, Cumberland, White Spine, King of Picklers, Chicago Pickling.

CITRON.—Colorado Preserving.

LETTUCE.—*Leaf:* Grand Rapids, Black Seeded Simpson.
Head: Hanson.
Cos: Trianon, Paris White.

PEAS.—*Extra Early:* Alaska.
Medium: Gradus, Nott's Excelsior, Sutton's Excelsior.
Late: Stratagem, Champion of England.

CORN.—*Early:* Cory, Golden Bantam.
Medium: Crosby, Kendall's Early Giant.
Late: Stowell's Evergreen, Country Gentleman.

MUSKMELON.—Rocky Ford, Montreal Market, Hackensack, Osage.

LEEK.—Musselburg.

PARSNIP.—Hollow Crown, Guernsey.

POTATO.—*Early:* Ohio, Eureka, Fortune.

PUMPKIN.—Jumbo, Sweet Sugar.

RADISH.—*Early Spring and Summer:* Scarlet Turnip White Tip, White Icicle, Non Plus Ultra.
Winter: China Rose, Black Spanish.

RHUBARB.—Victoria.

SPINACH.—Victoria, Viroflay.

SALSIFY.—Sandwich Island.

SQUASH.—*Summer:* Crookneck.
Winter: Warted Hubbard, Golden Hubbard, Marblehead, Boston Marrow.

TOMATO.—*Red:* Earliana, Bonny Best, Chalk's Jewel, Success, Matchless, Wealthy (on clay loam soil).
Pink: Early Minnesota, Globe.

TURNIP.—Extra Early Purple-top Milan, Golden Ball, Sutton's Magnum Bonum.

VEGETABLE MARROW.—Long White Bush, English Vegetable Marrow.

WATERMELON.—Hungarian Honey, Cole's Early, Iceberg, Holbert Honey.

VEGETABLES FOR INDOOR CULTURE.

LETTUCE.—*Leaf:* Grand Rapids.
Head: Big Boston, Hanson.
Cos: Paris White, Trianon.

RADISH.—Scarlet Turnip White Tip, Non Plus Ultra, Rosy Gem.

PARSLEY.—New XXX.

CUCUMBERS.—Davis Perfect, Rawson's Hothouse, Farquhar's Perfection, Vick's White Spine.

TOMATOES.—Industry, Queux Clipper, Comet, Lister's Prolific, Globe.

DESCRIPTION OF CUCUMBERS. Davis Perfect is a cross of the White Spine on one of the English varieties. It is of good, smooth shape, about eight inches long, dark green in color, and the heaviest cropper of the three, either indoors or out.

Rawson's Hothouse is much similar but not as long, not being over six inches. It is almost as heavy a cropper and very early.

Farquhar's Perfection looks like Davis Perfect, but is not as good a cropper.

Vick's White Spine gave excellent results as to number of fruits, but looks coarse and lacks in color.

DESCRIPTION OF TOMATOES. Industry is an English variety which we grew last year for the first time. It is a favorite in the Channel Islands; is a rich, red color, excellent in quality, very smooth, eye scarcely perceptible, firm, and even in size. The plant is short-jointed and stocky. The fruit is borne near the ground and in clusters of from five to eight. The average size is about four fruits to the pound.

Queux Clipper is much like Industry, but is somewhat less compact in growth. Trusses are also carried low, and fruit is of very high quality.

Davis Globe is a medium cropper producing a large, smooth, pink fruit, two to three in a truss. It is a fair cropper, but sacrifices quality for size.

The two first named are the best of the indoor commercial varieties that we have ever grown.

The following table gives the results secured with indoor tomatoes this past season. The crop in question was harvested in June and July and was the second crop taken from this house without change of soil.

INDOOR TOMATO CROP, JUNE AND JULY, 1910.

Name of variety.	No. of plants.	Fruit harvested. Lbs.	Average lbs. of fruit per plant per variety	Average yield per plant.		Average lbs. fruit per sq. foot of bed.	
				Sub-irrigated.	Surface watered.	Sub-irrigated.	Surface watered.
Lister's Prolific...	49	199.15	4.06	5.19	3.59	1.86	1.26
Industry.....	45	233.23	5.18	5.83	4.58	2.09	1.65
Globe (Pink).....	41	143.65	3.50	4.98	1.14	1.81	.43
Clipper.....	46	229.95	4.99	4.43	5.53	1.42	2.14
Comet	27	120.10	4.44	4.30	3.90	1.44	1.55
	208	926.08	General average yield per plant, 4.452 lbs.				

Respectfully submitted,

J. W. CROW.

PART XI.

THE PROFESSOR OF LANDSCAPE GARDENING.

To the President of the Ontario Agricultural College:

SIR.—I have the honor to present herewith a report from the Department of Landscape Gardening for the year 1910.

Academic Work.

The regular academic work, with the long and short courses, and teachers' summer school has been carried out as outlined in the curriculum, and needs no further mention here other than to say that with constantly increasing classes there is more urgent need for increased accommodation. We trust provision will soon be made for the enlargement of our building as already planned. When this is done, we will not only have better accommodation for our ever-increasing classes, but will be able to handle them to better advantage than at present.

Promoting Rural and Civic Improvement.

With the progress of the times and the material prosperity of recent years, there has naturally come a desire among our people for an improvement of the conditions in which they live. The unpainted house, the bleak yard, the treeless roadside, the ugly frontier town, and crudeness of earlier days is gradually giving way to the comfortable, modern home, the flower-bordered lawn, the elm-arched avenue, and the town and city beautiful. The movement for rural and civic improvement which has made its impression upon the older countries of Europe has reached this continent, and will, no doubt, under our newer conditions make even more rapid progress. An important factor in the spread of the movement here is the more or less recent discovery that beauty is an asset that can be realized on commercially, in short that improvements of this kind pay handsomely.

This department has been helping on the work in Ontario by aiding in the organization of Horticultural or local improvement societies, and in every way assisting in the work of the seventy or more societies which have already been organized. In connection with this work, illustrated lectures were given this year at the following places: Brampton, Brantford, Cornwall, Guelph, Goderich, Hamilton, Milton, Newmarket, Orillia, Port Dover, Springfield, St. Mary's, Strathroy, St. Catharines, Toronto, Walkerton, Whitby, and Winchester.

Under our supervision planting plans have also been prepared for the development of a number of public grounds, such as town parks, agricultural society grounds, etc., at the following places: Guelph, Hagersville, London, Strathroy, Stratford, Smith's Falls, Waterloo, and Woodstock.

The Improvement of School Grounds.

However much may be done by Horticultural and Local Improvement Societies, we believe that after all the most effective way of cultivating a love for the beautiful and a development of good taste among our people is to begin with the rising generation; and to this end an effort has been made to bring about an improvement in the appearance of the schools and school grounds of the Province. In

the bulletin prepared on this subject and distributed to school boards a year or so ago, an offer was made to assist any school board or board of education in the improvement of their school grounds by the preparation of planting plans. Already a large number of boards have availed themselves of this offer, and we now have in hand the preparation of improvement plans for over thirty schools in various parts of the Province. In this way, with the school as a public centre in every community, it is hoped the influence will radiate in every direction and show itself in the homes of the people.

Improvements on the Campus.

The care and management of the grounds about the College presents a variety of problems with which this department has to deal. After thirty years or more of growth, the trees and shrubs on the older part of the campus have attained a good size, and many have had to be thinned out to prevent undue crowding of those left. The beauty of these grounds is a source of pleasure and profit to our students and to all who visit the place. The newer part of the campus about the Macdonald Institute and Consolidated School is still in the making. The grading and levelling has now all been done, and most of the lawns seeded and brought into fairly good condition. A carefully considered plan was prepared last winter for a natural landscape development of the grounds, and most of the planting of trees, shrubs, and vines called for in this plan was done last spring. The season from first to last was very favorable for such work and the stock planted has done remarkably well.

As these newer grounds develop and the older ones require thinning out, the idea is to gradually blend the two into one as naturally as can be done with public highway separating them.

A Selection of Ornamental Shrubs.

The following lists have been prepared in response to frequent requests which come for advice regarding the best kind of shrubs to use for ornamental planting. These lists include a few of the best of the hardy ornamental shrubs from among about two hundred varieties that have been tested on the College campus during the past twenty years. In the first list the kinds are given in the order of blooming, and cover the season fairly well from May to September.

1. *Forsythia* (Golden Bells). A loose, open-growing shrub about 4 ft. high, not entirely hardy at Guelph, but valuable because of its very early flowering. In bloom about the end of April. Flowers, large golden yellow bells, appear before the foliage and last two or three weeks. The flowers show best against a dark background of spruce or other evergreens.

2. *Ribes aureum* (Golden currant). A vigorous-growing bush about 6 or 8 feet in diameter. Flowers golden yellow, very abundant and have a delightful fragrance. In bloom about the second week of May, and lasts two weeks.

3. *Pyrus Japonica* (Japan Quince). A showy bush 6 or 8 feet in diameter, with handsome, glossy dark foliage. Flowers large and showy, either brilliant scarlet, salmon, pink, or white. In bloom about middle of May and lasts nearly three weeks. Produces fruit which is very aromatic and is sometimes used for jelly making.

4. *Prunus Japonica* (Flowering Almond). A very handsome, small shrub about 3 feet in height. Bears a great profusion of pink flowers like little roses. In bloom about the third week of May and lasts a week or ten days.

5. *Caragana frutescens* (Siberian Pea Tree). A very hardy, showy little bush about five or six feet in diameter. Has a great luxuriance of fine light green leaves with an abundance of small clusters of pea-shaped yellow flowers. Bloom lasts a week or more.

6. *Syringa* (Lilac). There are now over a hundred varieties of lilacs offered in the catalogues of some of the large nurserymen. For a lengthy list see the catalogue of Ellwanger & Barry. The lilac is valuable because of its hardiness, richness and freedom of bloom, its delicate fragrance, handsome foliage, good habit, vigor and healthfulness. The older the bush the more freely it blooms. There are now both single and double flowers of nearly all the colors ranging from pure white through pinks and reds to lilacs and purple. With a good selection of varieties the bloom may cover the season from the third week in May to the first week in July.

S. persica is one of the earliest and *S. Japonica*, a creamy yellow, one of the latest flowering.

7. *Pyrus angustifolia* (Bechtel's Double-flowered American Crab). A crab apple tree of medium size, and very hardy. About four years after planting it begins to bloom and bears large, double pink flowers an inch and a half in diameter. In bloom about June 1st and lasts about two weeks. At a distance they look like small roses and are very fragrant.

8. *Spiræa van Houtei* (Van Houtte's spiræa). This is one of the best of the spireas. It makes a graceful, symmetrical little bush, about five feet in diameter, with slender drooping twigs. The bloom is pure white, very profuse, appears the first week in June and lasts about two weeks.

9. *Viburnum opulus sterile* (Snowball). This is a hardy, free growing shrub about 10 feet high, which bears large, round clusters of pure white flowers which look like snowballs. In bloom about first week in June and lasts over two weeks.

10. *Lonicera tartarica* (Bush Honeysuckle). A very hardy, symmetrical bush ten feet or more in diameter. Has an abundance of bloom every year, which appears the first week of June and lasts about a week. The bloom is followed by showy red or orange fruits which make the bush attractive long after the bloom is gone. There are red, pink, and white varieties, all of which are worthy of a place on the lawn. Good varieties may easily be grown from seed.

11. *Diervilla rosea* (Rose-colored Weigela). This is a handsome bush which is only half-hardy at Guelph when young, but becomes hardier with age. It makes a bush about 4 or 5 feet in diameter. The flowers are large and bell-shaped, appearing among the foliage the first week in June and lasting nearly three weeks.

12. *Philadelphus coronarius* (Garland Syringa). A hardy, vigorous bush about ten feet in height, bears large white flowers like orange blossoms. In bloom about middle of June and lasts over two weeks.

13. *Rhus cotinus* (Purple Fringe or Smoke Tree). A hardy, thrifty shrub, which grows 10 or 12 feet high and makes a shapely bush. About the middle of July it comes in bloom, and from then on till autumn is covered with curious fringe or plume-like flowers which are very showy.

14. *Hydrangea paniculata grandiflora.* A somewhat straggling growing shrub, which may become 6 or 8 feet high, but is better of being pruned back severely every spring, the same as is done with roses. Bears large panicles of white flowers. In bloom about the middle of August and lasts three or four weeks.

A Few More Good Ones.

In the preceding list we tried to confine our selection to a dozen of the hardiest and best bloomers to cover the season; in the following list are included a few other good kinds valuable for special purposes, or in southern sections:

1. *Altheas* (Rose of Sharon). Upright-growing shrubs five or six feet in height. Not hardy at Guelph, but do well in southern sections of Province. Bear large, showy flowers in a great variety of colors from white to red and purple. In bloom in August and September.

2. *Berberis Thunbergii* (Japanese Barberry). A very hardy, dense-growing bush about four feet high. Attractive at all seasons of the year. Comes out early in spring with fine, bright green foliage which assumes brilliant autumn colors of orange, scarlet and crimson. Flowers are greenish yellow and not conspicuous, but the clusters of bright red berries are attractive all winter. Makes an excellent hedge.

3. *Clethra alnifolia* (Sweet Pepper Bush). An upright-growing shrub, three or four feet in height. Bears terminal spikes of creamy white flowers in August.

4. *Cornus alba* (Siberian Red Osier). A very hardy, vigorous shrub six or eight feet high. Flowers creamy white in small flat-topped clusters. Particularly valuable for winter effect because of the bright red color of the branches, especially in early spring.

5. *Daphne cneorum* (Garland Flower). One of the daintiest of flowering shrubs, of trailing habit. Not over a foot in height and branches a couple of feet long, covered with dark glossy evergreen leaves. Bears numerous heads of fragrant pink flowers about 24th of May.

6. *Deutzias.* There are a number of varieties of this showy flowering shrub, varying in height from three to eight feet. They are not entirely hardy at Guelph, but do well in southern parts of Ontario. Very floriferous, bearing long white or pink clusters of bloom about the middle of June.

7. *Euonymus alatus* (Burning Bush). A hardy, symmetrical bush growing six or eight feet high. The flowers are greenish white and inconspicuous. Valuable for its color effect in fall and winter due to the showy rose-pink seeds which are exposed in orange-colored seed capsules.

8. *Kerria Japonica* (Globe Flower or Japanese Rose). A handsome flowering shrub about two feet in height with slender green branches and bright yellow flowers appearing from July to October. At Guelph the extremities of the branches usually kill back in winter to the snow line, but in southern Ontario it is quite hardy.

9. *Ligustrum Ibota* (Privet). A strong growing, symmetrical bush, 8 to 10 feet in diameter. Fairly hardy at Guelph, and in southern sections almost an evergreen. Foliage glossy dark green. Flowers appear about end of June as terminal white clusters; by autumn these become glossy black berries which make a marked contrast against the snow in winter.

10. *Robinia hispida* (Rose acacia). A low-growing locust about three feet high, with pretty compound leaves. Flowers rose-colored and very showy in loose hanging racemes. In bloom about the last of June.

11. *Rosa rugosa* (Wrinkled Japanese Rose). One of the best of the roses to grow as a shrub. Grows four or five feet high. Has leathery dark green leaves that are not attacked by insects as are other roses. Flowers large, single, white and purple. Semi-double and double varieties are now being introduced. Fruits are large, bright red and showy in the fall and winter.

12. *Symphoricarpus vulgaris* (Coral Berry). A dense-growing, hardy shrub, about 4 feet in height. Flowers are greenish red, appearing in July. The berries take on a coral red coloring in the autumn. Valuable for massing.

13. *Tamarix* (Tamarisk). Tall, graceful shrubs with long sprays of feathery flowers and foliage. Reaches a height of six or eight feet. Rather tender at Guelph and has to be cut back to near the snow line every spring. Does best in southern sections of the Province.

Floriculture.

Mr. William Hunt, Lecturer in Floriculture in this department, presents the following report upon this phase of our work.

The course of instruction as provided for in the College curriculum has been given to the second and fourth year students and to the Macdonald classes taking the course in Horticulture. The spring class of Normal teachers and the summer class of school teachers taking Elementary Agriculture were also given a short course of lectures. In each course, lectures have also been followed up with practical instruction. The increasing number of students each year necessitates an increased supply of plant material for the practical work. This means that we have been obliged to make a gradual reduction in the more permanent kinds of decorative plants in the greenhouses, and a corresponding increase in the kinds of plants more particularly suited for home and outdoor decorative purposes. This of necessity detracts to some extent from the attractiveness of the greenhouses from a display point of view. The extra prominence, however, given to the educational and practical features of floriculture more than compensates for the reduction made in the decorative features of the greenhouses.

Correspondence and Literature.

The demand for more information on flower topics is steadily increasing. In addition to the regular correspondence and replies to questions, I have contributed articles to horticultural magazines, newspapers, and to Horticultural Societies. Articles have also been written specially for use at Women's Institute meetings, to assist the work undertaken by the Home Economics Department of the Macdonald Institute.

Conventions and Meetings.

I have given addresses at several Conventions and Horticultural meetings during the year. Among the places visited were St. Catharines, Brantford, Drayton and Toronto. I have also acted as judge at horticultural exhibits or lawn and garden competitions at the following places: Brantford, Owen Sound, Tillsonburg, Fergus, Elora, and Guelph.

Hardy Roses.

The collection of roses planted in the spring of 1907 and 1908 have given good results, and were a great attraction to our summer classes and visitors. From the one hundred and fifty varieties included in the test some useful data regarding the hardiest varieties of roses have been obtained. The following list gives our choice of a selection of hardy varieties specially suited for the amateur's garden. A half dozen of the best of these are marked with an asterisk for the benefit of those who wish to begin with a smaller collection.

Bush Roses:
Alfred Colomb. Reddish crimson.
**Anna de Diesbach.* Silver pink.
Baron de Bonstettin. Dark crimson.
Dinsmore. Dark crimson.
**Clio.* Pale pink.
Earl of Dufferin. Purplish crimson.
**Eugene Furst.* Velvety crimson shaded maroon.
**Frau Karl Druschki.* White. A continuous bloomer
**General Jacqueminot.* Scarlet crimson.
**John Hopper.* Rosy pink.
Jules Margottin. Rose pink.
Mount Carmel. Deep reddish pink.
Oakmont. Silvery pink. Very free flowering.
Paeonia. Bright crimson.

Moss Roses:
Blanche Moreau. White.
Crimson Globe. Crimson.
Princess Adelaide. Pink.

Rugosa Roses:
Agnes Emily Carman. Crimson. Semi-double.
Rosa rugosa. Crimson. Single.
Rosa rugosa alba. White. Single.

Climbing Roses:
Crimson Rambler. Crimson Double.
Dorothy Perkins. Dainty pale pink.
May Queen. Rose pink.
Queen Alexandra. Pale pink.
Wm. Egan. Pale pink.

Gladioli.

Tests were continued this year with these popular summer flowering bulbs and a number of new varieties were added to our collection. From among about two hundred varieties included in the tests the following have been selected as a few of the best. A dozen of the choicest of these are marked with an asterisk for those who wish to begin with a smaller number of select varieties.

**Afterglow.* Salmon fawn shade, with pale blue centre. Large flowers. Massive spike.
**America.* Pale, delicate pink. Large flowers. Strong habit.
**Augusta.* White with blue anthers. Large spike. Lateral spikes well developed.
Attraction. Deep, rich crimson. White throat. Medium grower.
Baron Joseph Hulot. Deep violet blue. Medium flower.
Black-eyed Beauty. White with blotch of violet shading almost to black.
**Blue Jay* (Groff). Purplish blue with lighter shadings.
Brenchleyensis. Bright scarlet. Large spike. Strong grower.
**Dawn* (Groff). Pale salmon shaded lighter, suffused with carmine or claret on inferior petals.
Dazzler. Bright vermilion red wth chocolate crimson blotch.
**Evolution.* Delicate rose shaded darker. Attractive.
**Eugene Scribe.* Pale rose shaded carmine. Good habit.
George Paul. Deep crimson, shaded yellow, spotted violet-purple.
Giant Pink. Deep rose pink with markings of deeper pink. Strong growers.
Jane Dieulafoy. Creamy yellow, blotched crimson.
Lady Howard de Walden. Bright yellow, inferior petals flaked with carmine.
**La Luna.* Creamy yellow, heavily blotched with chocolate carmine.
Little Blush. Creamy white shaded yellow, heavily striped and shaded yellow.
Meadowvale. Almost pure white, slightly shaded crimson and pink.
**Peace.* White, slightly suffused pale carmine. Large spike. Very conspicuous.
Philadelphia. Deep pink, shaded and diffused lighter. Strong grower.
**Princeps.* Bright red. Lower petals streaked and blotched lighter.
**Prophetess.* Pearly white with maroon blotch. Round, compact flower.
Rosella. Light rose shaded purple and white. Large flower.
Scarsdale. Lavender. Strong grower.
**Victory.* Bright yellow. Large spike and flower.
Wm. Falconer. Creamy rose shaded and spotted red and carmine.

Geraniums.

Among the newer varieties of the semi-double flowering kinds tested recently, the following have shown points of merit that entitle them to a place in a collection of these universally grown house plants.

E. H. Trego. A splendid variety for pot culture. Very large truss of a bright cerise scarlet color. Vigorous grower.
Flamingo. Very free flowering. Medium-sized truss of bloom of a dark crimson color. Dwarf bushy habit of growth. A good bedding variety.
Mirador. Immense truss of reddish crimson flowers shaded magenta. Strong grower. Free flowering.
Miss Frances Perkins. Flowers a soft, pleasing shade of pink. Best grown as a pot plant.
M. Anatole Roseleur. One of the best light pink flowering kinds. Very large white and pink petals. A splendid variety for pot culture.

The following list of single flowering varieties are among the best recently introduced.

Alice of Vincennes. Large truss. White, suffused and margined carmine and scarlet. Aureole type of flower.
Eugene Sue. Immense trusses of bright scarlet.
Sir Fred Trevor. Crimson scarlet. White eye. Large flower.
The Sirdar. Brilliant scarlet. White eye. Very large flower.
Tiffin. Scarlet, upper petals shaded magenta. Robust grower. Good bedder

Annuals.

About 120 different varieties of annuals were tested in the "annual" border this season. This border is an interesting feature for visitors and students during the late summer and fall months.

The following varieties of the newer introduction of annuals have proved worthy of notice and would be useful additions to collections for garden decoration as well as for exhibits at summer and fall flower exhibitions.

Calendula "Meteor." A deep orange flower with red markings and shadings. Quite distinct from older types of these popular garden flowers.
Calendula "Trianon." Pale yellow with rich reddish-brown markings. A pleasing change from the older kinds.
Candytuft. Hyacinth flowered. Very large spikes of pure white flowers that last a long time in good condition.
Coreopsis marmorata. Rich bronzy brown flowers with markings of bright gold on petals. A pleasing change to the almost universal yellow colors in these flowers.
Dianthus "New Flame." A fine double dark crimson, free flowering variety of the Chinese Pink.
Poppy "Fairy Blush." Double white flowers, petals tipped with red or deep pink. A distinct type.
Sunflower "Starlight." Medium to small star-like flower of a soft lemon yellow shade with a black disc or centre. Very useful for cutting.
Dimorphotheca aurantiacum (Namaqualand Daisy). An introduction of 1908. Flowers bronzy orange. Very showy. Dwarf habit. Succeeds best in dry, hot weather. A good border annual for a dry, sunny position.

Respectfully submitted,

H. L. HUTT

PART XII.

THE PROFESSOR OF POULTRY HUSBANDRY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith the report of the Poultry department for 1910.

Teaching scarcely needs a detailed report. The usual lectures have been given to the regular College students. A change has been made with the senior students, who are now required to operate incubators, feed laying hens, and fatten, kill and dress chickens. The senior men have taken a deep interest in this work, and it is thought that this method will impress more firmly upon their minds the details, etc., of the system used than could be done by additional lectures. Lectures were given as in previous years to the Short Course students, Poultry Institutes and Farmers' Institutes.

It is a pleasure to report that this has been a most successful year with this department. The hens have laid well, the hatches have been above the average, the young stock has developed well, and the losses among newly hatched chicks have been much less than is usual with us.

The correspondence has increased from year to year; but this has been an exceptional year for poultry products, and the increased interest in the business has been in proportion. Many and varied are the demands of the correspondents; from the person who wishes to keep a dozen hens in a back lot, to the man of means who wishes to keep thousands of hens. This branch of the work is becoming a serious item, both as to the expense incurred and to the amount of time required.

EGGS.

More interest has been taken during this year as to the quality of the eggs that are placed on our large markets than heretofore, and consequently there has been an exceptional demand for information along the lines of the production and care of edible eggs. We had no difficulty in selling the December eggs of 1909 at 50c. per dozen, f.o.b., and we received the same price for November eggs this year. A few figures will be given in another paragraph as to the number of eggs received from our experimental pens, also the cost of production.

Egg production, especially the production of eggs during the winter months, is a very interesting topic, and there is no reason why at least one-third as many eggs should not be produced during the winter months as there are during the spring and summer months.

BREEDING LAYERS.

We are regularly asked what is the best breed, and we as regularly reply that we have seen no best breed. It is a question of strain or family rather than breed.

For a number of years we have been using trap-nests in the experimental pens, and have been endeavoring to build up some good laying families, from the best individuals. Later in this report will be given some data, in reference to the hatching quality of eggs, from which it appears that this is as important in the selection of breeders as in the production of eggs. Our aim so far has been to get individuals

that will lay one hundred and eighty or more eggs from October to October; some may think that this is too early a date to start the year, but our object is winter layers, and October begins the season of scarcity of eggs. So far not more than six or seven hens have proved themselves capable of laying two hundred or more eggs in a year, and at the same time produce eggs that will nearly all hatch and, further, chickens that will live. The final test is when the daughters are tested as to egg production, etc. Many two-hundred-egg hens are not worth much as breeders of two-hundred-egg pullets, but a few appear as if their pullets were out of the ordinary, and some of their sons have been very good breeders. It has been our practice, for at least three years, to be careful that the males we used were from a hen whose eggs hatched well, and whose chickens were thrifty and easily grown. We believe that this one point has had much to do with our success this year.

During the spring of 1910 a mating was made of a good hen, her half sister (also a good hen) and a few daughters of the first mentioned hen. These birds appear to have the desired qualities. The chickens hatched from this mating between April 12th and May 3rd were carefully leg-banded, so that we could know their exact pedigree. At the same time we hatched a number of chicks from pens of Barred Plymouth Rocks, that had not been specially bred for egg production, but more especially for shape and colour; both lots of chickens were raised on the same plot of ground, and were in every way treated alike, and both grew satisfactorily. Late in September the pullets from the above lots were caught up and placed in a house of two pens. On the one side of the house were placed twenty-three daughters of the bred-to-lay stock, and in the other pen twenty-three daughters of what we shall call the common stock.

Below is given the number of eggs produced by each pen for October and November of this year.

23 bred-to-lay pullets produced in October 101 eggs, and in November 337 eggs.

23 common pullets produced in October no eggs, and in November 66 eggs.

The bred-to-lay pullets matured earlier, and therefore will probably lay better during the winter months. It is expected that the common pullets will lay nearly as well during the summer months.

Feeding.

We try to simplify our methods and use only the common foods. There is plenty of room for experimental work along this line. Some few branches we are now working, but it is felt that where possible there should be no haste in publishing results that may possibly be contradicted next season. In another paragraph we give some tables, largely because the experiment has been watched by many with considerable interest. The results probably are not final.

We use as staple foods, corn, wheat, oats, buckwheat, sour milk, clover-hay, roots, waste cabbage, and of course grit and oyster shells. Usually during the short days the morning feed is fed the previous evening after the hens have gone to roost; then they are out of one's way. The grain is sown over the litter, and then forked, turning the litter; the straw is now on top, and the grain below, and when the hens get up in the morning they start to work to dig out the grain. At noon we feed hay, roots or cabbage. The night feed consists of whole grain given in troughs and what is not eaten is taken up. Rolled oats, *i.e.*, the rolled oats as used for horse feed —the hull and all are rolled and flattened—are kept constantly before the hens in hoppers. The birds like these oats better than any mash we have yet used. The milk is given as drink.

In working out the season's results for egg production, we have divided the year into two parts: October to February (inclusive) are called the winter months, and March to August (inclusive) are called the summer months. September is a month of housecleaning, and selling the surplus layers, etc., so that we have not been able to keep accurate records as to feed for this month.

This year we had 402 birds on experimental work, and during the first five months they laid 17,965 eggs, or an average of 44.6 eggs per bird. The following prices have been charged for foods; for green foods and grit no charge.

Grain $1.60 per cwt. Milk 20c. per cwt. Beef scrap and green cut bone 3c. per lb. It cost to feed the 402 birds for the five months $231.27, or the eggs cost us 15.36c. per dozen. I think a reasonable estimate of the cash value of these eggs would be 3c. each; granting this, each hen made a profit over and above the cost of feed of 76.5c. All of these birds were not kept for the eleven months—in some instances we did not need them after the hatching season; and moreover, the high price of feeds, together with a large stock of chicks, forced us to sell many early in the season, to keep within the appropriations.

The following table gives the results from 138 females for 11 months:

TABLE 1.

Egg Production and Cost of Feeding.

Collective Results for 138 Pullets from October 1st, 1909, to March 1st, 1910:

Males.	Females	——	House No.	Eggs laid.	Cost.	Average eggs per hen.	Am't grain consumed.
		Early April hatched.			$ c.		
2	23	R. I. Reds	6	1,131	15 21	49.1	851 lbs.
2	23	B. Rocks	6	1,098	14 81	47.7	826 "
2	23	R. I. Reds	5	821	14 74	35.6	820 "
2	23	B. Rocks	5	1,469	15 70	63.8	880 "
		Late May hatched.					
2	23	B. Rocks (weak)	3	694	14 09	30.1	748 "
2	23	B. Rocks (strong) ...	3	622	16 04	27.0	867 "
12	138			5,835	90 59		4,992 lbs.

Collective Results for 138 Pullets from March 1st, 1910, to September 1st, 1910:

Males.	Females	——	House No.	Eggs laid.	Cost.	Average eggs per hen.	Am't grain consumed.
		Early April hatched.			$ c.		
2	23	R. I. Reds	6	2,187	15 52	95.0	811 lbs.
2	23	B. Rocks	6	2,243	14 70	97.5	759 "
2	23	R. I. Reds	5	1,778	12 53	77.3	631 "
2	23	B. Rocks	5	2,185	14 41	95.0	746 "
		Late May hatched.					
2	23	B. Rocks (weak)	3	1,488	12 47	64.6	626 "
2	23	B. Rocks (strong)....	3	2,120	15 24	92.1	788 "
12	138			12,001	84 87		4,361 lbs.

It will be noticed in the above table that the three pens lowest in egg production during the winter months were also lowest during the summer months.

COLLECTIVE RESULTS FOR 138 PULLETS FOR 11 MONTHS, OCTOBER 1ST, 1909, TO SEPTEMBER 1ST, 1910.

Males.	Females	——	House No.	Total Eggs laid.	Total cost.	Average Eggs per Hen.	Total am't Grain consumed.
		Early April hatched.			$ c.		
2	23	R. I. Reds.....	6	3,318	30.73	144.2	1,662 lbs.
2	23	B. Rocks	6	3,341	29.51	145.2	1,585 "
2	23	R. I. Reds.....	5	2,599	27.27	113.	1,451 "
2	23	B. Rocks.....	5	3,654	30.11	154.4	1,626 "
		Late May hatched.					
2	23	B. Rocks (weak).....	3	2,182	26.56	94.8	1,374 "
2	23	B. Rocks (strong)....	3	2,742	31.28	119.2	1,655 "
12	138			17,836	175.46		9,353 lbs.

Average cost per dozen for winter months, 18.62c., or 19c.
" " " summer months, 8.48c.
" " " eleven months, 11.79c., or 12c.
Average cost of feeding each hen per month in winter, 13.12c.
" " " " " summer, 10.25c.
" " " " " for eleven months, 11.55c., or 12c.
Average number of eggs per hen, 129.2.
Average amount of grain consumed per bird (males included), 62.35 lbs., or 5.66 lbs. per month.

ANIMAL FOODS AS THEY AFFECT EGG PRODUCTION AND THE HATCHING QUALITIES OF THE EGG.

This experiment was planned to study the action of various meat foods on the hatching power of eggs, and secondly, how these foods affect egg production, especially during the winter months. After the hatching season was over the experiment was discontinued.

The plan of the experiment is for five years, with a different breed for each year. The males used in the different pens were brothers. Buff Orpingtons were used for this trial. The grain and green food were the same for each pen, and all housed in the same building. There were twenty-five females and two males in each pen. The following animal foods were used:

Pen No. 1—Received its animal food in the form of buttermilk, given as drink.
Pen No. 2—In this pen 10% of the dry mash was beef scrap.
Pen No. 3—Were fed beef scrap in a hopper, where they could eat all they wished.
Pen No. 4—Were fed no animal food.
Pen No. 6—Were fed nearly all the green cut bone they would eat, or about ¾ lb daily.

Several trials were made to determine the hatching qualities of the eggs during January, March and April.

THE FOLLOWING ARE THE RESULTS FOR 7 MONTHS, FROM OCTOBER 1, 1909, TO APRIL 30, 1910:

Pen No.	Whole grain.	Dry Mash.	Animal Food.	Total cost.	Total eggs laid.	Cost per dozen eggs.	Percentage of eggs hatched.
	Lbs.	Lbs.	Lbs.	$ c.		Cents.	
1	720	233	1,453	18 16	2,040	10.68	55.0
2	840	337	34	19 85	1,670	14.28	50.5
3	900	216	141½	22 21	1,664	15.84	33.0
4	900	224	.....	17 99	1,496	12.69	59.5
6	900	196	127¾	21 37	1,654	15.48	40.5

The Hatching Quality of the Egg as Influenced by the Stock.

This experiment was planned to demonstrate the advisability of using the best birds as breeders and egg producers.

The females consisted of forty-six Barred Rocks, late May hatched pullets all of similar breeding. Twenty-three of the largest and best looking pullets were placed in one pen, and to these were mated two males, full brothers, bred from a hen whose eggs hatched well, and all her chickens grew and developed into good, big, thrifty birds. In the other pen were placed twenty-three smaller pullets, or the culls of the forty-six; these pullets on the average were smaller, some were as large, but all were not as bright or vigorous in their appearance. To these were mated two cockerels, bred from a hen whose eggs hatched rather poorly, and whose chicks had a mortality of about 40%. The cockerels in themselves looked to be fairly good birds.

The feeding, housing, etc. for both pens were alike. The results in egg production are given in Table No. 1, on a previous page.

The hatching power and fertility of the eggs were tested in various makes of incubators. The eggs were hatched during January, March and April. In every test the eggs from the weaker birds were higher in fertility and lower in hatching power than were those from the stronger birds. The average of the tests are as follows:

	Strong Birds	Weak Birds
Percentage fertile	93.6	97.0
Percentage hatched	73.4	39.7

It is quite evident from the tables on egg production, and on the hatching qualities of the eggs, that a breeder should keep his best birds, and breed from these.

Hatching and Rearing.

Eggs hatched better this season than in previous years. The exact reason for this is hard to locate owing to several gradual changes that have been made in the general management of the stock from year to year, and also to changes in incubation.

As mentioned in a previous paragraph, we now pay special attention to the pedigree, growth and vigor of many of the males used; we also avoid feeding meat foods with the exception of buttermilk, and furthermore the birds are housed in better ventilated houses, or in other words the stock is more robust.

The incubators are carefully washed out with a 10 per cent. solution of a tarry compound before every hatch, and no dirty eggs are set except in a few experimental machines. The machines are operated for the first week at a higher temperature than usual, about 101 degrees as indicated by the inovo or egg thermometer.

Most of the machines this year were operated by students; a few had some experience, but the majority had never operated machines, and nearly all succeeded in getting good hatches.

Of the eggs sold, only a small percentage was reported upon unfavourably. Nearly all purchasers were well pleased. A few who purchased eggs did not get satisfactory results, probably owing to rough handling in transit, or other causes over which we have no control.

The system used for rearing was the same as outlined in last year's report, page 161, and therefore does not need repeating here; suffice it to say that the chickens have practically unlimited range over large fields. Under this system

they grow rapidly and economically. The early April hatched birds began laying freely by September 15. The cost of rearing the chickens by the above method to four or five months of age was practically the same as last season; *i.e.*, three and one half pounds of grain produced one pound of live weight.

Fattening Surplus Stock.

There is an increasing demand for well fatted chickens; in fact the demand exceeds the supply, and dealers find themselves forced to fatten the thin live chickens offered on the markets, in order to get the supply of fatted chickens required by the trade. Dealers inform me they can pay high rentals for buildings and have sour milk or buttermilk shipped in by express, and yet have a nice margin of profit. Surely our growers could do this cheaper.

During the past year this department has had over sixty different individuals fatten chickens, and nearly everyone has been successful. The average bird gained about one pound in two weeks' feeding. Each bird on the average consumed four pounds of grain and six pounds of milk, for the pound of gain made. Poor gains were made from Leghorns, Hamburgs and such cockerels. These birds made fair broilers, but unsatisfactory roasters. The ration used consisted of one-third each of finely ground oats, buckwheat and corn. This was mixed to the consistency of pancake batter with sour milk or buttermilk. The birds are fed light during the first few days or until their appetites become keen, after which the ration is gradually increased to all they will eat. But two feeds a day are given, and as near equal hours apart as possible. The chickens will readily eat by lamp light. If there is a secret to the process at all, it is in never overfeeding, but giving all they will consume.

Respectfully submitted.

W. R. GRAHAM.

PART XIII.

THE PROFESSOR OF BACTERIOLOGY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit the following report upon the work of the department of Bacteriology during the year ending November 30th, 1910.

INSTRUCTION. The academic work of the department for the regular men and women students of the College, and for the dairy short course is described in the respective calendars for those courses, and needs no further mention here. Two half days of laboratory instruction on poultry anatomy and poultry diseases were given the short poultry course students. Two half days were spent in the laboratory with the corps of Dairy Instructors for Western Ontario. A course of ten lectures was given the special Normal Class in the spring. Special laboratory instruction on poultry diseases, on the preparation of cultures for inoculating seed, and on dairy bacteriology, respectively, was given three men during the year.

PUBLICATIONS. Early in the year, Bulletin 176 was issued, giving the results of research by my colleague, Mr. D. H. Jones, on Bacterial Blight of Apple, Pear, and Quince trees. This bulletin is a valuable contribution to the knowledge on this disease, and the author has received many words of appreciation from leading fruit growers of the Dominion and abroad.

MEETINGS ATTENDED AND ADDRESSES GIVEN. I was privileged to attend the annual meeting of the Society of American Bacteriologists at Boston last December. An address was given at the annual meeting of the Western Ontario Dairymen's Association on "Yeasts as a Cause of Sweet or Fruity Flavor in Cheese." An address was given at the annual meeting of the South Grey Farmers' Institute on "Bovine Tuberculosis."

Mr. Jones delivered an illustrated address at the fall meeting of the Ontario Fruit Growers' Association on "Pear Blight, its Prevention and Eradication."

RESEARCH. The research during the year has been a continuation of the work as outlined in my report of last year, and in which good progress has been made.

Laboratory examination of material and specimens sent in by farmers and others was made as follows:

Butter	4	Miscellaneous	6
Calf	1	Organs of Animals	11
Canned goods	5	Pear and apple twigs	6
Cheese	1	Pig	1
Cows (tubercular)	2	Vegetables (potatoes, lettuce, etc.)	5
Diphtheria swabs	2	Water	11
Fowls	66		
Milk and cream	15	Total	136

LEGUME BACTERIA.

Cultures of nitrogen-accumulating bacteria for inoculating the seeds of alfalfa, clover, and other legumes were distributed under the same conditions as during the past five years. This work has greatly increased and demands a great deal of time in handling the cultures and attending to the voluminous correspondence incident thereto. During the season a total of 3,375 cultures were sent, an increase of 1,358 over the number distributed last season. Of the reports received as to the beneficial results from the inoculation of seed, 65.7 per cent. showed that the farmer believed the use of the bacteria had aided in securing a better crop. A detailed summary of this season's work along this line appears in the tables which follow:

NUMBER OF CULTURES DISTRIBUTED IN 1910.

	Alfalfa.	Red Clover.	Alsike Clover.	White Clover.	Vetch.	Peas.	Beans.	Sweet Peas.
Ontario	2005	645	57	0	5	84	21	14
P.E. Island	7	7	1	0	0	1	0	0
Nova Scotia	11	10	1	1	5	2	3	0
New Brunswick	19	13	3	0	0	1	0	0
Quebec	43	10	1	0	0	2	1	2
Manitoba	48	10	1	3	1	3	2	1
Saskatchewan	39	11	0	0	1	4	2	1
Alberta	57	3	0	1	1	6	0	0
British Columbia	96	52	7	4	1	4	1	1
Newfoundland	1	0	0	0	0	0	0	0
United States	7	13	2	1	1	9	3	0
England	1	0	0	0	0	0	0	0
South Africa	1	0	0	0	0	0	0	0
Totals	2335	774	73	10	15	116	33	19

Total number of cultures sent out during the year, 3,375.

Total number of persons to whom cultures were sent during the year, 1881.

RESULTS OF INOCULATION, 1910.

—	Alfalfa.		Red Clover.		Alsike Clover.		Peas.		Beans.		Sweet Peas.	
	+	−	+	−	+	−	+	−	+	−	+	−
Ontario	187	74	87	57	4	6	3	8	2	3	2	.....
British Columbia	10	5	10	4	.....	.....	....	....	....	....	.....	.....
Alberta	7	6	1	.....	.....	.....	1	....	....	....	.....	.....
Saskatchewan	8	4	.....	.....	.....	.....	....	....	....	....	.....	.....
Manitoba	4	2	1	.....	.....	.....	....	....	....	....	.....	.....
Quebec	7	5	1	2	1	.....	....	....	....	....	.....	.....
New Brunswick	.....	2	3	.....	2	.....	....	....	....	....	.....	.....
Nova Scotia	3	1	2	.....	.....	.....	....	....	....	....	.....	.....
P. E. Island	1	.....	1	.....	.....	.....	....	1	....	....	.....	.....
United States	2	.....	.....	.....	.....	.....	....	....	....	....	.....	.....
Totals	223	99	196	63	7	6	4	9	2	3	2	0

\+ Indicates benefit from the inoculation.
− Indicates no benefit from the inoculation.

During the present autumn, we sent supplementary blanks to two hundred and fifty farmers who had used the cultures for treating alfalfa and red clover seed in 1909, asking whether there was any difference in the vigor and yield from their treated and untreated seed. While the returns from these inquiries are not yet complete, a good many farmers report greater vigor and an increase in yield of ten per cent. to fifty per cent., and a few report double the yield on portions of the field where the seed was inoculated with the nitrogen-gathering bacteria. In view of these results, we feel that the work is worth while, and we are planning to distribute cultures during the season of 1911, under the same conditions as heretofore.

FURTHER RESEARCH ON FIRE BLIGHT.

By D. H. Jones: Fire Blight in the apple and pear orchards of the Province was not so severe this year as last. It was, however, very much in evidence in most sections, both in apple trees and pear trees.

A tour of inspection in the St. Catharines, Grimsby, and Niagara districts was made during August, and we found not more than half as many cases of fresh inoculation as we found the previous year. In general, blossom inoculation of the disease by bees and wasps and other insects was comparatively light. In one orchard, however, that of Mr. Jarvis, of Grimsby, blossom inoculation was very heavy. Several Gravenstein trees that had been loaded with blossom had well-nigh every blossom inoculated, and from the blossoms the disease had passed down into the twigs and thus killed off all the young growth. Many Greenings and Baldwins also suffered in the same way, though not so severely.

Twig inoculation apart from the blossom was very light. We attribute this to the fact that the aphids which carry the disease from twig to twig were very scarce this year.

A young orchard in Simcoe that we visited by request had a number of freshly planted trees inoculated with the disease by the Buffalo-tree-hopper. An old orchard adjoining the newly planted one had a number of mature apple trees that were very badly affected with the disease, in twigs, limbs, and trunk, and everything pointed to these as being the source of infection. The characteristic slit punctures of the Buffalo-tree-hopper were found in rows on the trunks of the young trees, and from these punctures the disease had spread until in some cases the tree was girdled and so killed. In other cases where the trees were not completely girdled, the diseased bark was carefully cut away and so the trees were saved.

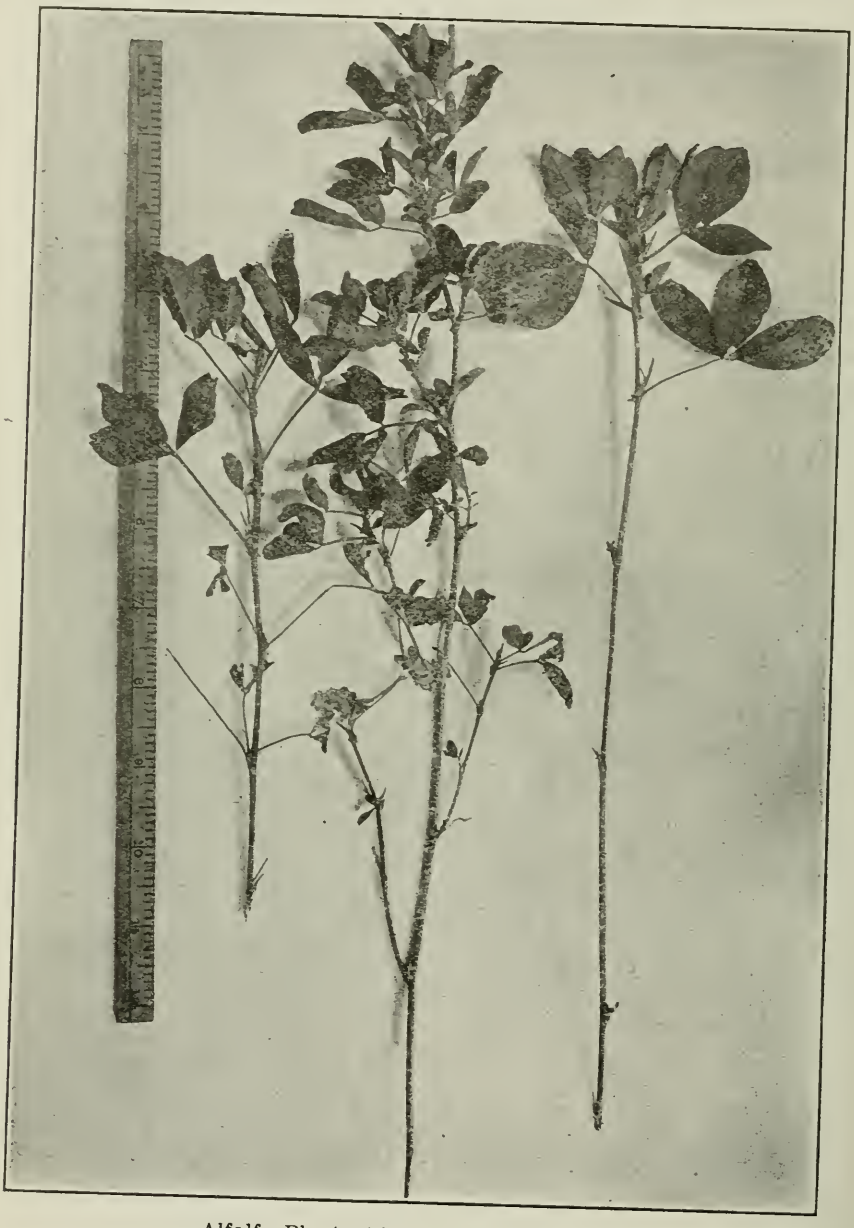
While fresh inoculation cases were not so very numerous, there were many instances where the blight had wintered over, and had done, and was doing, much damage. One notable case of this kind was the pear orchard of Mr. Broderick, St. Catharines. Here, along with pear trees of several varieties, were about twenty-five mature Clapp's Favorites. The previous year a good crop of pears had been taken from these trees, and a few cases of blight were noticed among the twigs and smaller limbs. This blight, not being removed, had wintered over, and during this season had spread so rapidly that eighteen of the trees had been killed outright, and the remainder required to be so heavily pruned in order to cut out the disease that they might as well be destroyed completely.

The pear orchard of Mr. W. McCalla proved to be a splendid example of what can be done in the control of the blight. Last year when we visited it there were numerous cases of blight throughout the orchard, and Mr. McCalla told us that he was half inclined to tear out all the trees. We advised against such a measure and gave a few directions regarding the removal of the blighted parts. The directions were followed, and when we visited the orchard this year we found ninety-eight per cent. of the trees absolutely free from the disease, and a heavy crop of good sound pears. What little blight there was, was due to wintering over of a few cankers that unfortunately had been overlooked during the operations. However, two or three hours of careful work was all that was required to remove all traces of the disease from the orchard.

In one orchard we found most conclusive evidence regarding the shot-hole bark-boring beetle (*Scolytus rugulosus*) being a carrier of the blight disease germs, thus bearing out our observations published last year. In this orchard there were a number of pear trees that were killed out by the blight last year. They were also infested with the shot-hole-borer. This spring these trees were removed, and young trees were planted out alongside the ground on which they had grown. During the summer these young trees developed the blight and eighty per cent. of them were killed out by October. In every instance it was found that the

1. Young pear tree killed by bacterial blight in one season, after being inoculated by the germs of the disease by the Shot-hole Bark-boring Beetle (*Scolytus rugulosus*). Over two hundred borings of the beetle were found in the trunk and branches of this tree, and the blight cankers were spreading in all directions around nearly every puncture.
2. One of the blight cankers near the base of the trunk of tree shown in Fig. 1. (*a*) The initial puncture, the point of inoculation; it is a very small hole in the centre of the small canker. From this the germs have spread within the bark, producing the large canker until the tree was nearly girdled at this point. The germs were present in immense numbers in the living bark outside the crack which outlines the dead cankered area. (*b*) The posterior extremity of one of the beetles protruding from a fresh boring; another beetle is close by. (*c*) A beetle running along the bark.

disease had been introduced by the shot-hole-borer. In one tree alone, as many as two hundred and fifty shot-hole borings were counted, and around most of these punctures the blight had extended, producing the characteristic blight canker. If



Alfalfa Plants Affected with Leaf Spot.

the old trees had been removed during the fall or winter and burned before spring, the beetles and their larvae, which winter over in the bark, would have been destroyed, instead of their being allowed to live over, to come out in the early spring and find their way to other trees, carrying the germs of the disease with them.

In a young pear orchard at the Experimental Fruit Farm, Jordan Harbor, there were a number of trees recently planted out, in which the blight was spreading. In every instance, the inoculation had occurred where the trees had been cut back at the nursery. The pruning tools used must have been infected, as a result of cutting diseased trees with them, and so the young trees had been inoculated when being cut back.

Leaf Spot of Alfalfa.

We have had a number of inquiries from different sections of the Province regarding a disease of alfalfa variously called rust, blight, leaf blight, and leaf spot. Although the disease is not new, it seems pertinent at this time to include in this report a brief description of the disease for the benefit of alfalfa growers in the Province and in the Dominion.

Alfalfa Leaves Affected with Leaf Spot. Natural Size.

Leaf spot has been known since 1832, when it was described in France by Libert. Aside from occasional notice by various authors, nothing was done toward a more thorough understanding of the life history of the disease until 1890, when Chester (Annual Report of Delaware Experiment Station, 1891), made some experiments which led him to believe that the disease could not be prevented by treating the seed, because, like corn smut, the disease entered its host through the green growing parts. The disease was later studied by Combs (Annual Report Iowa Experiment Station for 1897), and it is largely from his report that the present description is drawn.

Leaf spot is caused by a fungus, *Pseudopeziza medicaginis* (Lib.) (Sacch.). The disease is characterized by small brown or black spots on the leaves, varying in size from a pin point to one-sixteenth of an inch in diameter, visible from both sides of the leaf, although more conspicuous on the upper surface. The general shape of the spots is circular with a rather irregular outline. There may be only a few spots, or they may be very numerous. Through these brown spots, the mycelium or thread-like vegetative portion of the disease is distributed. Soon there are formed blackish pustules about the middle of the brown spots on the upper side

of the leaves, and in these pustules are borne the spores, which serve the same purpose as the seeds of more ordinary plants.

The disease may appear at any time after the plant has attained a growth of four to six inches from the seed, but most commonly appears after the first year's growth. Usually when many spots occur on the same leaf, the leaf soon turns yellow and falls off. This falling of the leaves, and the natural loss in vigor, due to the diseased condition before the falling, constitutes the great damage done by the disease.

Combs showed, first, that the plants become infected by the spores of the disease floating in the air, and falling upon the upper suface of the leaves of the plant, where they germinate and enter the plant, probably through the small openings called breathing pores or stomata; second, that the disease is entirely local, that is, its mycelium extends to no other part of the plant than that defined by the brown spot.

Fields of all ages and in almost any stage of growth may be attacked. It appears in alfalfa grown on all kinds of soil, and under almost all conditions. Probably more or less of it may be found in almost any alfalfa field in any season, in dry weather as well as in wet.

Aside from the method of spread through the air, the spores of the disease may be carried in soil used for inoculation of new alfalfa seedings. The disease sometimes appears, however, in newly seeded fields where soil has not been used for inoculation. In such cases, the infection may come from spores sown with the seed, or from host plants of other species.

The only practicable method of control known, is to mow the plants when the disease progresses so far that the growth is checked. Cutting causes the plant to throw up new shoots which may outgrow the disease. Newly-seeded fields should not be mown closely—only the tops of the plants clipped off, as close mowing if followed by a period of dry weather may kill the alfalfa. If leaf spot appears a short time before the hay crop is ready to cut, it is wise to mow the field a few days early to avoid the loss of leaves, which may be considerable if cutting is delayed.

Before concluding my report, I wish to express my appreciation of the loyalty and earnest aid given to the work of the laboratory by the other members of the department staff, everyone of whom has contributed largely to such success as has been attained in the work of the department.

Respectfully submitted.

S. F. EDWARDS.

PART XIV.

THE PROFESSOR OF FIELD HUSBANDRY AND DIRECTOR OF FIELD EXPERIMENTS.

To the President of the Ontario Agricultural College:

SIR,—I take pleasure in submitting to you the report of the work done in the department of Field Husbandry for the year 1910. I am pleased to be able to state, in the outset, that the work of the past year, both educational and experimental, has been on the whole satisfactory. The students of the various courses have again shown a deep interest in both the inside and the outside work. The experiments in Field Husbandry at the College have been conducted along many important lines, and the co-operative work throughout the Province has been conducted with enthusiasm by the thousands of farmers who are in this way doing

An excursion of farmers, who have just examined the annual pasture mixture, which is in the foreground.

so much for themselves and for the country as a whole. It is probably safe to say that approximately 18,000 farmers visited the experimental grounds during the past summer. There were an unusually large number of requests during 1910 to assist various organizations in Ontario in conducting short courses, in delivering lectures, and in judging at fall fairs, seed fairs and larger exhibitions. While we have complied with many of these requests, the calls were so numerous that we were unable to comply with all of them without a great sacrifice of the work of a provincial nature.

WORK IN FIELD HUSBANDRY DURING THE PAST YEAR.

In order to get some idea of the various demands on those connected with the department of Field Husbandry and of the work undertaken during the year, it seems necessary to give a concise outline of the work for 1910 as follows:

The educational work at the College was rather greater in 1910 than previously, and included the delivering of lectures and the giving of demonstrations before classes in the regular course at the College, as outlined in the College circular; the delivering of lectures before the students in the short course in seed and stock judging, before the students from the Ontario Normal schools, and before the Public school teachers attending the summer course in July, etc.

The experimental work in Field Husbandry at the College was conducted during the past year on about 2,000 carefully measured plots located in a section of about fifty acres which is used particularly for this purpose. An exceedingly important branch of that work which has developed during the last two years is what is generally known as plant breeding, or the work in improving the leading varieties of cereal crops by means of systematic selection and by cross-fertilization. There were about 120,000 hybrid plants grown separately in the experimental grounds in 1910.

Explanations of the experiments in Field Husbandry are made to the thousands of farmers who visit the College annually. Besides these, various associations come to the College and are nearly always taken to the experimental grounds and receive information regarding the objects and the methods of the work. The experimental plots at the College form object lessons for the students of the freshman, the sophomore, and the senior years who are taken systematically to the grounds in the regular lecture periods.

The co-operative experiments in Field Husbandry in connection with the Ontario Agricultural and Experimental Union receive important attention by this department, which has direct charge of the growing, the preparation, and the distribution of seed; and the direction and supervision of the experiments on the thousands of farms throughout Ontario.

The office work has been unusually large during the past year. The preparation of the results of the College experiments for publication in the Annual Report of the College, the examination and the preparation of the results of the co-operative experiments throughout Ontario for the Annual Report of the Ontario Agricultural and Experimental Union, the various newspaper articles emphasizing the important results of experiments conducted both at the College and throughout Ontario, the very large correspondence with Ontario farmers, the preparation of addresses, etc., cause much thought and a very large amount of work. It is gratifying to know, however, that through these means the results of investigations are brought to the homes of a very large number of our farmers.

During the past year I have been very ably assisted, both in the work at the College and in the extension work of my department throughout Ontario, by the very efficient staff of the department. During the past year Mr. John Buchanan, B.S.A., who had been lecturer in Field Husbandry for some time and who had been recently appointed as Associate Professor, severed his connection with this institution in order to accept a more remunerative position as Superintendent of Parks in the City of Calgary. We regretted very much losing Mr. Buchanan, who had been very faithful and proficient in his work at this institution. His place at the College was filled through the promotion of Mr. W. J. Squirrell, B.S.A., who has also been in the department for several years. Mr. Squirrell now takes the greater part of the lecturing in connection with the regular College course. During the past year, he has also taken charge of short judging course at three places, and has addressed institute meetings at two places throughout the Province. Mr. C. R. Klinck, B.S.A, was also advanced during the year, his present title being Assistant in Plant Breeding, in which he is doing very

efficient work. Mr. Klinck attended and delivered addresses at seed fairs and at annual meetings of Farmers' Institutes at five localities over Ontario during the past year. Mr. A. W. Mason, B.S.A., in his capacity as Assistant in the department of Field Husbandry, is assisting largely in the work in the office in connection with the experimental work at Guelph and the co-operative work throughout Ontario. Mr. Mason attended seed fairs and delivered addresses in four localities throughout Ontario in 1910. Mr. A. E. Whiteside has been foreman of the department for fully fifteen years, and in that capacity has charge of the men and the students when at work in connection with the various experiments, and has also given excellent assistance in planning experiments and in making careful records of the same. In the office, Miss J. I. Coxon and Miss E. I. Holmwood take much interest in the work, and have given able assistance, not only in the regular stenographic work, but also in the preparation of results of experiments for publication. Besides the work here indicated, I have also assisted in short judging courses, in judging at various exhibitions, and in addressing different agricultural meetings throughout the Province. During the year, I made three

A Corner of the Experimental Grounds.

trips outside of the Province: one, to give lectures at the short judging course at the Agricultural College of Iowa; another, in speaking at agricultural meetings in Prince Edward Island; and another, in attending the Corn Show and addressing agricultural meetings held at Worcester, Massachusetts, for the New England States. These trips were made at times when I could leave the College to good advantage, and they cost the Province nothing, while they gave me an excellent opportunity to come in contact with the agriculture of these different sections of country and to be in a better position to do more efficient work in our own Province.

Experimental Work in Field Husbandry.

It seems both wise and necessary to make certain statements in reference to the experimental work at the beginning of the report, in order that the results may be read with intelligence and that much repetition might be avoided.

About fifty acres of land, divided into upwards of 2,000 plots, are used for experiments conducted with varieties of grain, root, tuber, grass, clover, fodder,

silage and other crops; with artificial, green and barnyard manures; with methods of cultivation, selection of seed, dates of seeding, etc. All of these experiments are conducted with the greatest care, and for several years in succession in order to secure strictly accurate results. These experiments deal with the crops grown on over nine-tenths of the cultivated land in Ontario.

The grounds have a gentle slope towards the southwest, and the soil is an average clay loam. About one-quarter of the land is manured each year with twenty tons of farmyard manure per acre; thus most of the land receives an application of farmyard manure once every four years. No commercial fertilizers are used except in distinct fertilizer experiments, and these occupy only a small number of plots each year. Within the past twelve years, one green crop has been plowed under on each section of the field. The plots vary in size according to the requirements of the different experiments, and the yields per acre are determined from the actual yield of the plots in every instance.

The work in the experimental department consists in planning the various experiments; laying out, seeding, and looking after the field plots; harvesting, threshing, weighing and testing the grain; taking up, weighing, counting, testing and storing the potatoes and roots; cutting, weighing and harvesting the grass, corn and fodder crops, etc., and also in picking by hand the samples of grain grown on the plots, some to be sown on the plots the following year and some to be distributed for co-operative experimental work throughout Ontario. A great deal of thought and care is required in planting, supervising and examining these plots, and in studying, comparing and summarizing the results for presentation in reports, bulletins, newspaper articles, and lectures.

Results of Experiments.

All of our field experiments are conducted for at least five years before conclusions are drawn, and many of them are continued for a much longer period of time. For the results of some of the tests which were carried on for five or more years previous to 1910, the reader is referred to former reports. The results of some of the experiments which have as yet been conducted for only one or two years, are held over until the tests can be carried through for at least another summer. As different seasons vary so much in temperature, rainfall, etc., the average results of experiments continued for several years are of much greater value than those secured from only one or two years' work. Owing to the great care exercised in the work, and the number of years through which the experiments are continued, we are able to present the results with much confidence in their reliability and in their practical value. From year to year the reports of the experimental work are being more widely read and more carefully studied by the farmers of the Province, and this is leading to a greater interest in crop production and a deeper knowledge of plant life on the farms of our country.

Weather Conditions for 1910.

For a proper undestanding of results of experiments with farm crops when those experiments have been conducted in the field, it is important to have a knowledge of the weather conditions of the different seasons during which the experiments have been conducted. In each of the past eleven years, careful records of the rainfall have been kept in connection with the department of Physics at the College. The following table gives the total amount of precipitation in each of six

months of the growing season in each of the past eleven years, as recorded at the College:

Amount of Precipitation during the Six Growing Months.

Month.	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	Average 11 years.
	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
April.....	1.69	2.24	2.43	2.69	2.10	1.82	1.44	1.66	1.33	3.60	3.13	**2.19**
May.....	1.03	3.26	1.67	2.44	3.01	3.89	2.71	2.64	3.47	3.43	2.75	**2.75**
June	4.47	1.53	3.06	3.05	2.86	3.24	4.06	1.11	3.21	1.33	.78	**2.61**
July.....	3.05	4.07	6.43	2.67	4.99	4.60	4.65	1.92	3.25	4.54	1.89	**3.82**
August	.87	3.51	2.18	3.47	3.88	1.98	2.13	.62	2.75	.89	3.18	**2.31**
September.	1.52	2.45	3.58	1.48	2.80	2.85	2.49	2.87	.73	.86	3.29	**2.27**
Total....	12.63	17.06	19.35	15.80	19.64	18.38	17.48	10.82	14.74	14.65	15.02	**15.95**

Partial View of the Experimental Grounds.

The amount of rainfall at the College for the six months, from April to September, in the average of the past eleven years is 15.95 or practically 16 inches. In 1910, the amount of rainfall during the six months was almost an inch less than the average for the whole period. In examining the records for the separate months, it will be seen that the rainfall of the past season was greater than the average for the past eleven years in the months of April, August and September; and that it was considerably less in the months of June and July, in fact the amount of rainfall in June and also in July for 1910 was less than that of any one of the corresponding months in the ten years previous. Especially was this true in the month of June when the rainfall at Guelph was less than an inch, being the lightest rainfall in any one month. It is interesting to note that the total rainfall in June and July in 1910 was only 2.67 inches, while that of June and July in 1909 amounted to 5.87 inches, or more than double that of this year.

At the College the early part of the autumn of 1909 was comparatively dry, the winter was about normal, the greater part of March and of April of the present

year was very fine, May was cold and backward, June was pleasant with but few showers, and July was somewhat warm and comparatively dry. It is probably safe to say that the weather conditions of the Province, on the whole, were somewhat similar to those here stated.

Owing to the exceptionally early spring of the present year, the seeding of some of the grain crops took place much earlier than usual, in fact, the varieties of spring wheat, and barley, and oats were sown in the latter part of March, while the average time of seeding for these three crops is usually about the middle of April.

The Production of the Fields of Ontario.

We believe that the farmers of Ontario are just beginning to realize the possibilities of obtaining very much larger crops from their land than they have obtained in the past. Simply by the adoption of some of the best methods in farming, great increases in yields and economic results could be obtained in a very short time. An intelligent application of the principles brought out through the results presented in this report would undoubtedly exert a very great influence upon crop production in this Province. Not only would the improvement of farm crops be of great value to those actively engaged in crop production, but it would be of material advantage to the country as a whole. The prosperity of the people of the city as well as those of the rural districts is dependent largely on the success of the farming population. Is it not true that the advance in prices of living recently is largely due to the fact that the number of consumers in Canada has been increasing more rapidly than the producers? In the Province of Ontario cities are increasing in population, mines are being developed, and railroads are being constructed, all of which tends to greatly increase the number of non-producers in the Province. In comparison with this, it is questionable whether the rural population has made any marked increase. If this is correct for Ontario, is it not also true, to a large extent, for the whole of the Dominion of Canada and for the United States? If the people of the North American continent who are non-producers increase at a greater rate than the producers of food products of the farms, it seems natural that there will be a gradual increase in the price of farm products. Under such circumstances, there is almost sure to be a movement from the city to the farm. It seems to me that agricultural prospects were never better in Ontario than they are at the present time. Not only are the farmers themselves taking a greater interest in their profession, but there seems to be an increasing desire for men in business and in professional life to take up agriculture, either as a business or as a side issue. While in past years there has been an evident inclination of grouping small farms into larger ones and increasing the areas devoted to pasture, the tendency at the present time appears to be the subdivision of the larger farms into smaller ones, and the adoption of a more intensive system of agriculture. It is interesting to note that both the pasture and hay lands of Ontario showed a gradual increase for the ten years from 1898 to 1907 inclusive, and that there has been a gradual decrease in the grass lands of Ontario during the last two or three years. According to the reports of the Ontario Bureau of Industries, the grass lands of this Province were increased by 1,427,764 acres from the years 1898 to 1908, but they have been decreased by 225,577 acres during the past two years. In corn alone there has been an increase of 113,703 acres during the past two years. There has also been an increase in the acreage of potatoes, mangels, and five classes of grain crops.

One of the most pleasing features in connection with crop production in Ontario is the fact that the yields per acre of some of our principal grain crops are apparently increasing from year to year. The yields per acre of our three most extensively grown cereals have increased, on an average, about one-fifth in grain production for the last twelve years, in comparison with the twelve years previous. This is certainly a very commendable showing and speaks well for the farmers of this province. This great increase appears to be largely due to the introduction of better methods of farming and to better varieties of farm crops. There are yet exceptionally fine opportunities and almost unlimited possibilities for the agriculture of Ontario. To any one who makes a study of our agriculture and its possibilities, it is not difficult to realize that the young men of our Province have plenty of room for their best thoughts and their deepest studies in their endeavors to become good farmers in the highest sense of the term. The fertility and the cultivation of the soil, the ripening and storing of the crops, the selection and the preservation of the seed, the feeding and the care of the farm animals, the breeding of the plants and the animals, and many other problems of great value

The Principal and one of the classes of the Macdonald Consolidated School, who have been using the experimental plots as an object lesson.

and intense interest require not only a practical training in the operations of the farm, but also a good knowledge of the underlying principles of agriculture, and good judgment in the application of those principles to the various operations on the farm. Even the most common plants and animals and the most humble operations on the farm are worthy of the best thoughts of our best men. In order to know which are the most valuable crops to grow to meet the various requirements, the most desirable varieties of each class to furnish the largest amount of food of the best quality, the most suitable time and method to sow each variety to use advantageously the fertility and the moisture in the soil, etc., are all questions of the utmost importance for every farmer to determine for himself.

Classes of Farm Crops.

Careful thought should be given by the farmer regarding the most suitable crops for growing on his own farm to best fulfil the objects in view. The selection of crops is necessarily governed, to a considerable extent, by the location of the farm, the quality of the soil, the principal kind of farming which is followed, etc. It

is therefore to the interest of every individual farmer to study these conditions out for himself when determining the kinds of crops which are likely to give the best satisfaction under his own particular circumstances. In order to best understand these crops, however, it is well for him to glean as much information as possible regarding their relative standing in productiveness and the comparative value of these crops in the Province. In order to throw some light on this very important problem, we present results which should be of value to the crop growers of Ontario.

The Bureau of Industries for the Province of Ontario furnishes reports annually on the crop production of the Province. These statistics have been carefully collected since the year 1882, and the information is given to the farmers through the reports and the bulletins of the Department of Agriculture. The yields of the grain crops per acre are presented in the form of bushels. As a general rule, farmers believe that oats will yield more bushels per acre than barley, and that barley in turn is likely to yield more bushels per acre than wheat. As there is a marked variation, however, in the weight per measured bushel of some of the grains, it is difficult for the farmer to get a correct comprehension of the productiveness of the different grains from a simple study of the number of bushels per acre. It is both interesting and instructive to compare the results of the different crops grown in Ontario under similar standards of measurement. It should be even more valuable for him to know the amount of digestible constituents produced per acre by the different classes of farm crops grown under average conditions. Both the chemical composition and the digestibility of our most common grains have received a considerable amount of study in a number of countries, especially in Germany and in the United States. It is not the part of this report to go into the details of these determinations, nor yet to give an elaborate explanation of what is meant by the different food constituents, but many of our farmers have already given these matters much study, and will undoubtedly much appreciate the results which are here presented.

The following table gives the average yields for twenty-eight years in both bushels and pounds per acre of the grain crops of Ontario as obtained through the reports of the Bureau of Industries, and also the amount of digestible protein and of digestible carbohydrates determined from the average yields of the crops here presented and from the per cent. of digestible matter, compiled by Armsby, Jordan, etc., as printed by the Pennsylvania State College, etc.:

Crops.	Grain.		Digestible nutrients.	
	Bushels.	Pounds.	Protein Pounds.	Carbohydrates Pounds.
Barley	27.7	1,330	116	920
Oats	35.6	1,210	111	644
Winter Wheat	20.8	1,248	89	880
Spring Wheat	15.9	954	72	668
Field Peas	19.4	1,164	219	623
Buckwheat	20.0	960	75	526
Rye	16.4	918	59	646

The figures here presented are worthy of careful study. While the average yield of oats in Ontario for the last twenty-eight years has been 35.6 bushels in

comparison with 27.7 bushels for barley, yet we observe that the barley has given an average of 120 pounds of grain per acre more than the oats. Of all the grains here reported, barley stands at the head of the list in productiveness, and even winter wheat has given a greater average yield of grain than oats by 38 pounds per acre. From an examination of the figures presented on the digestible constituents per acre, it will be seen that in protein the field peas surpassed all others by a wide margin. The barley and the oats do not vary greatly in this constituent. In the amount of digestible carbohydrates, however, barley stands at the top of the list, with 920 pounds per acre, which is an average of 276 pounds per acre more than the digestible carbohydrates produced by oats. A study of this table shows the comparatively large amount of valuable food constituents which are being produced in Ontario annually by six-rowed barley and by field peas.

Particular attention has been given to a study of the different classes of farm crops by conducting careful experiments at the College with leading varieties of

A group of school teachers who were taking the ten weeks' course in Elementary Agriculture.

each class. One of these experiments was conducted in duplicate in each of six years. In all of these years, twelve varieties and classes of farm crops were grown in duplicate, making in all twenty-four plots in the experiment each season. In the spring of 1907, another experiment made up of eight different classes of farm crops was conducted in duplicate, and therefore occupied sixteen plots. This experiment has now been repeated in each of four years. In these two experiments seven of the crops were similar. The following table gives the average results of the twenty separate tests made within the past ten years:

Class of crop.	Average yield per acre for 10 years.	
	Straw (tons).	Grain (lbs.).
Emmer	2.13	2,767
Barley	1.84	2,759
Oats	2.50	2,711
Hulless Barley	1.82	2,524
Spring Wheat	2.35	2,069
Field Peas	1.55	1,910
Spring Rye	2.13	1,762

The foregoing tabulated results show that the Emmer heads the list in grain production. Emmer is a type of spring wheat which is not as yet grown very extensively in Ontario. In the co-operative experiments of the Experimental Union, however, Emmer has made a high record when tested in a small way on the farms throughout the Province. When Emmer is threshed, there is not a clear separation of the grain and the chaff. The spikelets simply become detached from the head and the grain is usually surrounded by the chaff after it has passed through the threshing machine. Both the chaff and the grain are ground together and are used as a feed for farm stock. For further results regarding Emmer, the reader is referred to another part of this report.

It will be seen that in the ten-year experiment at the College, as well as in the grain production in Ontario for twenty-eight years, the barley has surpassed the oats in productiveness. The yield in favor of barley, however, is not quite as marked at the College as it is throughout Ontario. This may be partly accounted for from the fact that the oats have occupied the same place in the rotation and practically the same kind of soil as the barley, while over Ontario barley is occasionally sown on a somewhat poorer soil than oats. These various results, however, tend to show the value of barley as a large producer of grain in Ontario.

Thirty-five Varieties of Farm Crops Grown Continuously at the College from Sixteen to Twenty-two Years.

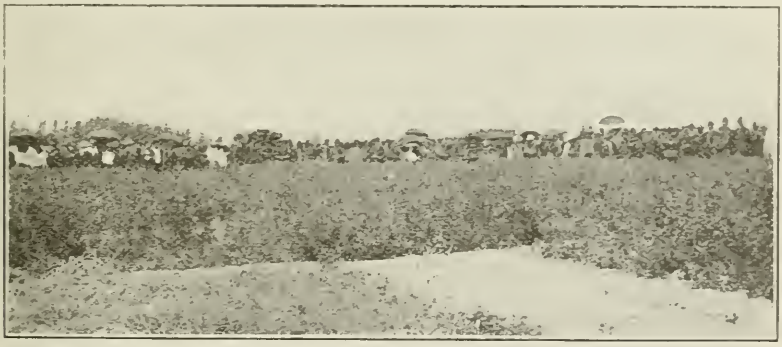
If it is necessary to frequently introduce seed of a certain variety from a different soil, or climate, or locality, the work of crop improvement on the individual farms is greatly limited. If, on the other hand, it is possible to satisfactorily grow a crop on one farm for a number of years without a change of seed, the work of plant improvement has many possibilities. It will be seen, therefore, that the length of time that a crop can be grown successfully on any one farm without a change of seed from some outside source has an exceedingly important bearing on the work of plant improvement. As a number of varieties of oats, six-rowed barley, two-rowed barley, hulless barley, winter wheat, common spring wheat, durum spring wheat, and potatoes have been grown in our experimental grounds from sixteen to twenty-two years without a change of seed from outside sources, the results should be both interesting and instructive. I therefore take the liberty of presenting some of those results for consideration in connection with this problem.

Yields of Varieties of Cereals and Potatoes Grown Continuously on the Same Farm.

Crop.	Variety.	Length of period years.	Bushels per acre.		Average Bushels per acre.		
			First year.	Last year.	First 8 years.	Last 8 years	Whole Period.
Oats	Joanotte	22	80.9	94.8	89.0	89.0	**87.4**
	Siberian	22	73.5	89.2	81.0	93.8	**87.0**
	Oderbrucker	22	75.0	96.7	82.2	88.9	**84.9**
	Probsteier	22	69.1	96.6	80.8	86.7	**84.0**
	Waterloo	22	64.7	79.8	81.1	88.9	**84.2**
	Bavarian	22	72.1	76.4	78.5	84.4	**81.6**
	Egyptian	22	57.4	91.7	72.4	81.2	**75.4**
	Black Tartarian	22	52.9	60.5	67.0	78.4	**70.2**

YIELDS OF VARIETIES OF CEREALS AND POTATOES GROWN CONTINUOUSLY ON THE SAME FARM.—*Continued.*

Crop.	Variety.	Length of period years.	Bushels per acre.		Average Bushels per acre.		
			First year.	Last year.	First 8 years.	Last 8 years.	Whole Period.
Six-rowed barley..	Mandscheuri	21	51.9	99.4	66.3	80 2	73.3
	Oderbrucker	21	47.2	89.5	57.3	73.0	66.2
	Common Six-rowed	21	41.7	86.0	53.6	69.9	63.8
Two-rowed barley..	Mensury	21	38.8	88.5	50.9	66.5	61.7
	French Chevalier	21	55.4	82.9	55.3	57.6	59.0
Hulless barley	Black Hulless	21	31.3	70.5	38.9	45.9	44.3
	Hungarian	21	51.0	63.7	38.7	44.7	42.7
Winter wheat..	Early Red Clawson	16	40.3	48.5	51.8	43.5	47.6
	Bulgarian	16	34.7	32.0	46.3	39 8	43.0
	Dawson's Golden Chaff	16	38.1	43.7	56.8	49.3	53.0
	Treadwell	16	16.5	34.5	41.0	43.5	42.2
Common spring wheat..	Herison Bearded	21	27.2	35.8	27.6	31.7	30.7
	Pringle's Champion	21	21.2	39.0	25.2	33.1	31.1
	Saxonka	21	10.6	41.4	26.5	34.5	31.8
	Red Fern	21	21.9	34.2	27.9	32.0	31.1
	White Russian	21	22.1	37.7	27.1	33.0	31.0
	Red Fife	21	15.5	44.0	25.8	35.5	31.7
	Colorado	21	15.8	31.3	22.5	29.2	28.4
Durum spring wheat..	Wild Goose	18	35.5	49.2	39.8	39.3	38.8
	Sorentina	18	30.8	34.7	33 6	34.6	33.7
	Medeah	18	31.8	43.3	35.9	42.0	34.7
Potatoes....	Empire State	21	162.0	295.0	207.2	224.6	225.1
	Rural New Yorker, No. 2.	21	129.0	284.2	178.5	207.8	204.8
	The Daisy	21	157.5	330.0	166.6	231.5	211.4
	White Elephant	21	67.0	323.3	159.5	228.4	206.3
	Rose's New Invincible	21	78.0	318.8	164.2	232.1	211.1
	Stray Beauty	21	49.0	249.2	139.6	185.1	164.3



A large party of farmers examining Alfalfa in the Experimental Grounds.

Of the thirty-five varieties of farm crops which have been grown continuously from sixteen to twenty-two years, the yield of grain per acre in 1910 was greater than the yield per acre in either the first or the second year of the experiment in the case of all the varieties, with the exception of two of spring wheat and four of winter wheat. On the whole, the average yield per acre during the latter part of

the period has been greater than the yield per acre for the corresponding period at the commencement of the experiment. The soil on which these varieties have been grown has changed but little in fertility, and no plant selection has been used in this particular test. It seems quite possible to grow the same varieties for a considerable length of time without change of seed, providing care is taken in the quality of the seed used.

Rotation of Crops.

I believe it is very important that every farmer should adopt the rotation of crops best suited to his own special conditions. It is impossible to mention any one rotation which is best under all circumstances. Where practicable, however, every rotation should contain a nurse crop with which to sow the smaller seeds, a cultivated crop to assist in the liberation of plant food and in the eradication of weeds, and a leguminous crop to obtain nitrogen from the atmosphere and to secure valuable fertilizing elements from the subsoil. In fact, it should be the aim to make every crop in the rotation help in the preparation for the crop which is to follow. In the experiments which have been conducted at the College in which winter wheat, barley and corn have been grown on both clover and timothy sod, it has been found that the average increase in yield per acre from the former, as compared with the latter, amounted to 44.7 per cent.

Choice of Varieties.

There is probably no phase of crop production in Ontario regarding which greater interest is centred than in the selection of varieties most suitable for the conditions under which they are grown. While it is true that many farmers have taken pains to secure the most suitable kinds, we realize that there are still many farmers that give this subject but little attention, and in fact a few farmers are growing some old varieties, the names of which they do not know, and the results of which are quite inferior. The variations in varieties of any one class of farm crops are usually very marked. These variations are frequently greater and more significant than many people realize. After growing, and testing, and studying over two thousand varieties of farm crops within the past twenty-five years, nearly all of which have been grown for at least five years in succession, I am thoroughly convinced that more attention should be given to varieties, both for the immediate result and as a basis of plant improvement. Variety, in the true sense of the word, expresses heredity and implies pedigree. The pedigree may indicate that great care and considerable knowledge have been employed in the development of the crop, or it may mean but very little indeed. If every new and well established kind of crop could be confined to one distinct name, the term variety would have a deeper meaning than it sometimes has at the present time. It is unfortunate that old varieties occasionally receive new names simply for the purpose of giving them false values and to enable those who are selling seeds to obtain greater prices thereby. It must not be overlooked, however, that there are many true varieties of practically all classes of farm crops which are very distinct and have characteristics which differ materially and which are fairly constant. The farmer, while unable to make careful tests of a large number of varieties, should lose no opportunity in securing the best information possible from the agricultural colleges and experiment stations, and test for himself those varieties which have given the most satisfactory results in his own country. With these few leading kinds he can, by

simple experiments, ascertain which variety or varieties are best suited to his own farm. By this method, he can secure the most suitable varieties for his own particular circumstances.

The Selection of Seed.

While it is important to give special attention to the varieties of crops most suitable to grow on the farm, it is also important to give the proper care in the selection of the seed of the individual varieties. From many experiments conducted at Guelph and other places, it is plain to be seen that good seed is absolutely essential in the production of good crops. In experiments which have been conducted at Guelph from five to eight years with each of eleven different classes of farm crops, the average results show that the large seed surpassed the small seed by 19.1 per cent. for the grain crops, 40.3 per cent. for the rape, and 60.1 per cent. for the root crops. It was also found that in the case of each of seven differ-

A plot of the Mammoth Winter Rye, which averaged over 6 feet in height in 1910.

ent classes of crops with which experiments were conducted, that the medium-sized seed gave yields between those obtained from the large and the small seed. In other experiments, greater yields have been obtained from plump as compared with shrunken seed, from sound as compared with broken or weevily seed, and from well-matured as compared with immature seed.

Improvement of Farm Crops by Plant Selection.

The importance of securing the best varieties of farm crops and the best selections of seed of those varieties for the best immediate results has already been dealt with in this report. It is also very important to have the very best varieties possible as the foundation for improvement, either for the work of systematic selection or of hybridization. Although many varieties of farm crops are fairly constant in their characteristics, yet it will be seen on examination that individual plants will vary more or less. This being true, it indicates a prolific field of work for the observant and careful farmer for his own benefit, and particularly to the scientific man whose aim it is to improve the farm crops of the country. The improvement of farm crops through the selection of the plants can be carried out in dif-

ferent ways, one or more of the following methods being usually adopted: (1) By taking from a field a composite selection of the most promising plants. (2) By selecting from the field some of the individual plants which most closely comply with the ideal of the plant breeder, and (3) By making use of a nursery plot in which a large number of uniform seeds are planted at equal distances apart, and from which the best individual plants are selected from those which have had equal advantages of growth and development. In the first method referred to, the seeds of the different plants are sown collectively, while in the other two methods the seeds from the individual plants are planted separately. The work of the Canadian Seed Growers' Association has been largely along the line of the first mentioned method, although any one of the three methods here referred to may be used as the starting point by the members of the association. Professional plant breeders most deeply interested in the systematic work of seed selection, usually adopt either the second or the third or both of these methods. Dr. Nilsson, of Svalof, Sweden, and a number of other plant breeders are using the second method here referred to. At the Ontario Agricultural College, both the last two methods have been in use, and some very interesting results have been obtained in securing improved varieties of barley, oats, millet, rye, etc. To illustrate what has been done in this line, permit me to refer to what is known as the O. A. C. Number 21, Barley. In the spring of 1903, 9,972 selected seeds of the Mandscheuri barley were planted by hand at equal distances apart in the Experimental department at the College. When the plants were ripe, they were carefully examined and thirty-three of the most promising ones were selected, harvested, and threshed separately. In 1904, thirty-three separate lots of barley were grown from the plants selected in the year previous. From that time forward, only the best strains were grown in the tests as follows: 14 in 1905, 8 in 1906, 7 in 1907, and 3 in each of the past three years. Of all the selected strains, the one which is known as the O. A. C. No. 21, has made the best record. In each of the last three years, it has given better results than the Mandscheuri variety in yield of grain, in freedom from rust, and in both length and strength of straw in the co-operative tests throughout Ontario. The grain is quite easily distinguished from that of the Mandscheuri variety.

About two hundred and fifty varieties of oats, obtained from twenty or more countries of the world, have been under test at Guelph. Nearly all of these have been grown for at least five years. I am now in a position to state that some of the largest yielding strains of oats in the regular experiments at the College for the last two years are those obtained through selection of the individual plants, as has been described for the O. A. C. Number 21 barley. I believe that any one of the three methods of selection here referred to, could be used not only at an experiment station, but also on individual farms where the men have the inclination, the patience, the suitable conditions, and the time for such work. There are a number of private plant breeders in Germany, who are devoting practically all of their time towards the improvement of farm crops for commercial purposes. It is quite probable that in the near future an increasing number of men on this side of the Atlantic will devote their energies towards the improvement of certain crops, through systematic selection, to the advantage of themselves and to the farmers generally.

Hybridization.

It is only in recent years that much attention has been given to the improvement of farm crops through hybridization. I believe that there was never a time in which there were such good opportunities for excellent work along this

line than there are at present. Within the next few years, there is sure to be a clearer conception regarding the laws of heredity and a more wide-spread application of those principles to crop production. Heredity may be described as the transmission of parental characteristics to the offspring. The laws of heredity in the plant world appear to be very similar to those in the animal world. Heredity in plants, therefore, is at the very basis of plant life, and consequently has a close relationship, either directly or indirectly, with the whole fabric of agriculture. Some of the greatest scientists of the present day, such as, DeVries in Holland, Bateson in England, Davenport at the Carnegie Institute, and Castle at Harvard University, are making a study of heredity their life work; and other men of note, such as Burbank in California, The Garton Bros. in England, Nilsson in Sweden, Drs. Wm. and C. E. Saunders in Canada, Biffen of Cambridge, Webber of Cornell University, and Groff of Ontario are working along the more practical lines of heredity as they apply to plant production. There has probably been no time in the world's history in which a larger number of men have been working, or a greater interest manifested in the study of heredity than at the present time.

Cattle pasturing on a crop produced from 51 lbs. of Oats, 30 lbs. of Early Amber Sugar Cane, and 7 lbs. of Common Red Clover Seed per acre.

The scientific investigations of Darwin, and Mendel, and DeVries, and Galton, and Weismann, and Bateson and many others, show us that, although great advances have been made in our knowledge of the laws of heredity, there are scarcely any of these leading scientists who will accept the conclusions of the others. While it is true that our knowledge of heredity is yet quite limited, it is also true that the advancement made during the last few years has been really wonderful. Men deeply interested in the improvement of plants, and especially those of economic value in agriculture, are not only making a study of plant breeding themselves, but are watching the results of scientific investigations in various parts of the world, in order to secure information which will help them in securing the desired results. It is scarcely necessary to state that there are but few men who have made a searching study in the laws of heredity, and at the same time are making as deep a study of the application of those laws in meeting the needs of the people in the work of plant improvement. During recent years, however, a few men here and there are endeavoring to make a practical application to our common farm crops of some of the best scientific knowledge which they can secure.

Even though much care is taken in the systematic selection of farm corps, we find that the best strains of the best varieties do not always possess a combination of all the most desirable characteristics. The work of cross-fertilization frequently enables certain combinations which it seems exceedingly difficult to secure in any other way.

At the Ontario Agricultural College we have done a considerable amount of work in the past few years in the cross-fertilization of our leading varieties of winter wheat, spring wheat, oats, barley and peas. In 1910, we had about 120,000 hybrid plants grown separately. The results, so far, are promising, although we have not as yet grown any of our new hybrids in large quantities. Within the past two or three years, we have secured from small plots of our hybrids some high yielding strains of oats, winter wheat and spring wheat. Some of the thinnest hulled oats which we have ever produced at the College are those obtained from one of our hybrids. A six-rowed barley with long, stiff straw and of handsome appearance has been produced, which ripens about ten days later than any of the other varieties of six-rowed barley. The object of securing this barley has been to obtain a productive variety with a long, stiff straw which could be mixed and grown satisfactorily with some of our standard varieties of oats, such as the Siberian or the Banner. We have found by experiments conducted over a series of years, that suitable varieties of barley and oats, when mixed in the right proportions, have produced upwards of two hundred pounds of grain per acre more than either of the grains when grown separately. In the past, it has been necessary to use an exceptionally early ripening variety of oats to grow with a standard variety of barley. If the hybrid here referred to will prove satisfactory, as it promises, it will fill an important place in our agriculture, as we now grow about one-half million acres of mixed grains in Ontario annually. I believe it is possible to secure a barley as here described, by use of hybridization, while it would be practically impossible to secure the same through straight selection, as all of the varieties and all of the individual plants of each variety mature too early. I believe there are great possibilities awaiting those institutions which can give sufficient attention to the development of new varieties of farm crops by means of cross-pollenization. It should be clearly understood, however, that such work requires many years of patient endeavor and of good financial backing, in order to obtain the best results.

Co-operative Experiments in Ontario for a Quarter of a Century.

The distribution of seed for experimental purposes with the object of improving the farm crops of Ontario has been conducted through the medium of the Ontario Agricultural and Experimental Union. The work of this organization is an outgrowth of the experimental investigations conducted at the Ontario Agricultural College, and the apparent needs of the farming community of the Province. It is an important connecting link between the experimental work of our College and the farmers of the country. The great object of the co-operative experimental work in Ontario is to help the farmer to help himself. Its aim is to encourage the farmers of all classes to do better work for themselves and for others than they have been doing in the past. It endeavors to give men a deeper interest in farming, a higher opinion of their occupation, a greater appreciation of their responsibilities, an opportunity of makng more money, and the means by which they can take a more prominent part in the progress and the development of their country. Although the co-operative work had a small beginning, and was at first confined to the testing of a few crops and fertilizers, it has in-

creased until it now includes thousands of experimenters. From time to time, new lines of activity have been added, until many branches of agriculture have been included in the system. A great bulk of the co-operative experiments have been conducted by the farmers themselves upon their own farms. The work in Ontario has been purely a volunteer movement from start to finish. No financial help whatever has been offered any one to undertake or carry through the co-operative work. The materials for the experiments, the instructions for making the tests, and the blank forms for reporting the results are furnished free of charge to those who engage in the work. Experimenters in crop production use the soil on their own farms, conduct the experiments themselves, and report the results to the College. In those experiments in which crops are produced, the produce is retained by the experimenters as their personal property, except in some instances in which small quantities are returned to the College for comparison.

The co-operative work in Field Husbandry has been conducted for a longer time than that of any other department. In Field Husbandry alone, there have been 58,812 distinct tests made throughout the Province since the work was started twenty-five years ago. Each of these tests consisted of from two to ten plots. The increase in the number of experimenters in Field Husbandry can be seen from the following figures which show the average yearly number actually engaged in the work in each of the five five-year periods during the last quarter of a century.

Five Year Periods.	Average Annual Number of Experimenters.
1886 to 1890	71
1891 to 1895	1,060
1896 to 1900	2,992
1901 to 1905	3,379
1906 to 1910	4,278

It will therefore be seen that during the last five years the co-operative experiments in Field Husbandry have been conducted annually on an average of 4,278 farms, the greatest number in any one year being 4,856.

In 1910, there were in all thirty-nine separate and distinct lines of co-operative experiments conducted throughout Ontario with field crops. These included spring and fall grains; root crops; forage, fodder, silage and hay crops; culinary crops; the growing of grains, grasses and clovers in different combinations; the application of commercial fertilizers and farmyard manures; etc.

The system of co-operative experiments here described is very different from a system of seed distribution where no definite instructions nor systematized plans are given for conducting accurate work and for reporting the actual results. An observant person would probably notice that the former has many commendable features not found in the latter, and that the latter has some objectionable features which are not included in the former.

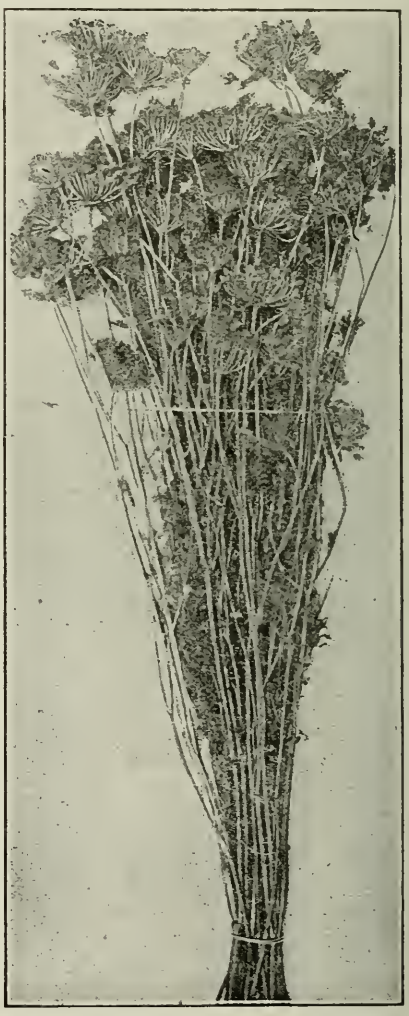
Although the Experimental Union, through its system of co-operative experiments, has been doing very excellent work in the past, we believe that greater results await it in the future and that it will continue to exert an increasing influence for the betterment of agriculture in Ontario. For the results of the co-operative experiments for the past year, the reader is referred to the Annual Report of the Ontario Agricultural and Experimental Union for 1910.

Growing Grains in Mixtures for Grain Production.

From what has been previously stated in this report, it will be clearly seen from the results there presented that there is much evidence to show the great

importance of using the very best varieties of farm crops. The value of pure seed of high quality is also demonstrated through the results of these experiments. While these things are true, it is nevertheless important to look into the advisability of growing certain different classes of farm crops in mixtures by using definite proportions of certain varieties in making up these combinations. From the results of the experiments which have been conducted along this line, we find in some cases quite marked advantages from the use of certain combinations of seed grain. We would therefore, invite a careful study of the results obtained along this line of investigation.

A Plant of Alfalfa Seed grown in the College plots in 1910.



Carrot Seed grown at the College in 1910.

Experiments in the growing of grains in different combinations have been carried on at the College in an experimental way for some twenty years. It is believed that the result of these experiments has had a considerable amount of influence in the use of certain combinations throughout Ontario. No statistics regarding the acreage of mixed grains in the Province were collected by the

Ontario Bureau of Industries previous to 1907. During the last four years, however, the statistics show that the acreage devoted to mixed grains has been gradually increasing, as will be seen from the number of acres used for these mixtures to be as follows: 1907, 443,100; 1908, 456,049; 1909, 474,530; and 1910, 497,936. It will therefore be seen that during the last four years there has been an increase of 54,836 acres.

One of the first experiments with mixed grains which was conducted at the College included oats, barley, spring wheat, and peas. The experiment was conducted in duplicate in each of five years, and these grains were grown separately and in eleven different combinations, having two, three, or four grains in each mixture. The average results show that the grain which was grown in mixtures produced larger yields per acre than the same kinds of grain grown separately in from ninety to ninety-five per cent. of the different tests. Of the eleven different mixtures used, the combination of oats and barley gave the highest average yield of threshed grain per acre. The mixture gave fully 200 pounds of grain per acre more than either oats or barley when grown separately.

Alfalfa Seed Pods.

An Umbel of Carrot Seed.

It has been stated by some farmers that certain varieties or classes of seed might be added to a mixture without reducing the yield of the original mixture, and at the same time furnish a crop from the additional seed which would be an entire gain. In order to glean information on this question, an experiment was conducted in duplicate in each of five years in order to ascertain whether a seed mixture composed of one bushel of oats and one and one-half bushels of barley per acre could be improved by the addition of a small quantity of some other kind of seed. In addition to the mixture of oats and barley here mentioned, four other combinations were made up by adding to this standard mixture one-half bushel of each of the following kinds of crop: flax, emmer, spring wheat, and hulless barley. The average results of the ten tests made in the five years show that the greatest yield of grain per acre was produced by the use of oats and barley without the addition of any of the other kinds of grain used in this experiment. Whenever flax, emmer, spring wheat or hulless barley were added to the standard mixture of oats and barley, it decreased the yield per acre even though a greater amount of seed was used in each case.

Barley and Oats Sown in Different Proportions.

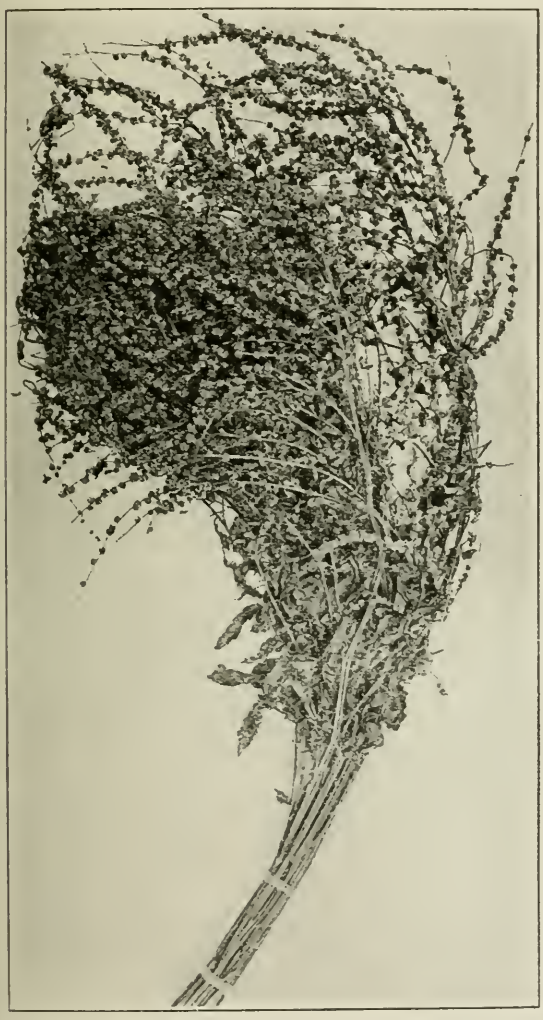
For ten years in succession, experiments have been conducted in duplicate at the College by sowing nine different proportions of oats and barley in order to determine which mixture and which quantity of seed would give the best results in the production of grain and straw. One experiment was started and was continued for six years and then it was dropped and another experiment was started and has now been conducted for four years in succession. In the first test, the lightest seeding used consisted of one-half bushel of oats and one-half bushel of barley, and the heaviest of one and one-half bushels of oats and one and one-half bushels of barley per acre. The average results show that the greatest number of pounds of grain per acre was produced from the mixture of one bushel of oats (34 pounds), and one bushel of barley (48 pounds), or a total amount of 82 pounds of mixed seed per acre.

The second experiment was started in the spring of 1907, and has been conducted in duplicate each year since that date. This also consisted in testing nine different proportions of oats and barley. A mixture of four pecks of oats and four pecks of barley by weight per acre was the only mixture which was similar in this and in the previous experiment. The experiment was conducted twice in 1907, once by using the Mandscheuri barley and the Daubeney oats and once by using the Chevalier barley and the Siberian oats. In 1908, the experiment was repeated as in 1907, except that the two-rowed Canadian barley was used instead of the Chevalier barley in combination with the Siberian oats. In 1909, and in 1910, the varieties used were similar to those described for 1908. The following table gives the average of the duplicate results of this experiment for the four years in tons of straw and in pounds of grain per acre, and also shows the average percentage of each kind of grain in the crops produced.

Mixtures—quantities of seed sown per acre by weight.	Percentage of Oats and Barley in crop—4 years.		Average yield per acre—4 years.	
	Oats.	Barley.	Straw.	Grains.
			Tons.	Lbs.
3 pecks Oats, 3 pecks Barley	37	63	1.79	2,873
3 " 4 "	31	69	1.83	2,878
3 " 5 "	26	74	1.78	2,934
4 " 3 "	44	56	1.82	2,908
4 " 4 "	38	62	1.82	2,983
4 " 5 "	33	67	1.78	2,925
5 " 3 "	47	53	1.82	2,930
5 " 4 "	46	54	1.73	2,871
5 " 5 "	38	62	1.77	2,785

It is indeed interesting to note that in the second experiment, which has been repeated for four years, as in the first experiment, which was repeated for five years, a mixture of four pecks of oats (34 pounds) and four pecks of barley (48 pounds), has given the greatest yield of threshed grain per acre. It will therefore be seen that the results of experiments conducted at the Ontario Agricultural College during the past nine years indicate pretty strongly that under the average conditions under which these experiments were conducted,

a mixture of 34 pounds of oats and 48 pounds of barley, or a total of 82 pounds per acre has given a higher yield per acre than any one of sixteen other combinations. An interesting point in connection with this experiment is the fact that the largest amount of seed per acre gave comparatively low results in grain production in each of these two distinct experiments. In the tabulated results



A Plant of Mangel Seed grown at the O. A. C. in 1910.

A Stem of Mangel Seed.

here presented, it will be seen that a mixture of five pecks of oats and five pecks of barley per acre was surpassed by the mixture of three pecks of oats and three pecks of barley per acre by an average annual yield per acre of 87 pounds of grain. It will also be seen that a mixture of one bushel of oats and one bushel of barley per acre surpassed the mixture of five pecks of each per acre by an annual yield of practically 200 pounds of grain per acre.

Different Varieties of Farm Crops Grown in Combination.

An experiment was started in 1907, and has now been conducted for four years in succession, in comparing different varieties which can be grown in combination in order to find out the most desirable mixtures for use. A medium ripening variety of oats and a medium ripening variety of barley do not, as a rule, mix well together, owing to the fact that barley generally ripens several days earlier than oats. For this purpose, a very early variety of oats should be used with a six-rowed barley, or a very late variety of barley should be used with an ordinary maturing variety of oats. If this precaution is not taken, the varieties will not ripen together and the results are decidedly less satisfactory, even though the yields might in some cases be slightly greater. The following table gives the percentage of barley and other grains in the crops produced and also the average results in yield of both straw and grain per acre for the four years.

Mixtures—quantities of seed per acre, by weight.	Percentage of Barley and other grains in crop. (4 years.)		Average yield per acre. (4 years.)	
	Barley.	Other Grains.	Straw.	Grain.
			Tons.	Lbs.
Black Hulless Barley, 60 lbs., Common Emmer, 40 lbs.....	62.65	37.35	1.27	2,086
Guy Mayle Hulless Barley, 60 lbs., Siberian Oats, 34 lbs...	49.86	50.14	1.50	2,438
Black Hulless Barley, 60 lbs., Siberian Oats, 34 lbs.....	57.00	43.00	1.36	2,204
Two-rowed Canadian Barley, 48 lbs., Banner Oats, 34 lbs...	56.25	43.76	1.48	2,358
Two-rowed Canadian Barley, 48 lbs., Siberian Oats, 34 lbs.	56.35	43.65	1.43	2,359
French Chevalier Barley, 48 lbs., Siberian Oats, 34 lbs.....	55.87	44.13	1.70	2,399
Mandscheuri Barley, 48 lbs., Daubeney Oats, 34 lbs.....	71.03	28.97	1.29	2,526
Mandscheuri Barley, 48 lbs., Alaska Oats, 34 lbs.....	68.78	31.22	1.37	2,551
Mandscheuri Barley, 48 lbs., Siberian Oats, 34 lbs.....	65.41	34.59	1.27	2,275
Mandscheuri Barley, 48 lbs., Banner Oats, 34 lbs.....	65.55	34.46	1.38	2,419
Mandscheuri Barley, 48 lbs., Joanette Oats, 34 lbs.....	69.50	30.50	1.46	2,418
Mandscheuri Barley, 48 lbs., Black Hulless Barley, 60 lbs..	60.60	39.40	1.26	2,323
Mandscheuri Barley, 48 lbs., Guy Mayle Hulless Barley, 60 lbs	66.22	33.78	1.34	2,420
Mandscheuri Barley, 48 lbs., Dakota Mammoth Rye, 56 lbs..	60.75	39.26	1.57	2,014
Mandscheuri Barley, 48 lbs., Common Emmer, 40 lbs.....	72.32	27.69	1.28	2,363
Mandscheuri Barley, 48 lbs., Wild Goose Spring Wheat, 60 lbs	70.06	29.94	1.38	2,269
Mandscheuri Barley, 48 lbs., Early Britain Peas, 60 lbs....	88.95	11.05	1.35	2,431
Mandscheuri Barley, 48 lbs., Prussian Blue Peas, 60 lbs....	87.78	12.22	1.44	2,257
Mandscheuri Barley, 48 lbs., Flax 56 lbs.....	90.60	9.40	1.37	2,445

The tabulated results here presented show the great influence of barley in determining both the quantity and the quality of the crop produced. It shows, in a very direct way, the influence of the Mandscheuri barley in these respects. Previous to 1910, the combination of Mandscheuri barley and Daubeney oats gave a greater yield of grain per acre than any other mixture of barley and oats. With the results for 1910 included, however, we find that the Mandscheuri barley and the Alaska oats, when combined in the proportions of one bushel each, heads the list with an average yield of 2,551 pounds of grain per acre or an average yield of 25 pounds over the mixture of Mandscheuri barley and Daubeney oats, which stands second in productiveness. Of all the nineteen different combinations, the two here referred to are the only ones which gave an average total yield of over twenty-five hundred pounds of grain per acre per annum. The mixture of Mandscheuri barley and Banner oats was surpassed by the mixture of Mandscheuri barley and Daubeney oats by 107 pounds of grain per acre per annum.

Percentages of Grains Produced by Different Mixtures.

For four years in succession, an experiment has been under way in which eight kinds of grain have been used in different combinations. One of the principal objects of this experiment has been to ascertain the relative power of the different kinds of grain in reproducing themselves in the following crop. The mixtures have been made up in two different ways: first, by using equal quantities of seed by weight of all the varieties: and second, by using the same amounts of seed of each variety as is usually sown when the grains are grown separately. Each of the mixtures here described was sown at the rate of 112 pounds of seed per acre. Each part of the experiment was conducted in duplicate each year. The following table gives the average results of the two tests for the four years and shows the percentage of each grain in the crop produced for each of the methods of combination indicated above:

Varieties used in each Mixture.	Uniform weights of seeds sown. 8 tests.		Quantities of seed in same proportion as when grown separately. 8 tests.		Average of two classes of mixtures. 4 years. 16 tests.
	1910.	Average 4 years. 1907-10.	1910.	Average 4 years. 1907-10.	Average of two averages.
Six-rowed Barley (Mandscheuri)	21.5	24.7	20.0	23.1	23.9
Oats (Banner)	18.8	19.2	13.3	12.9	16.1
Spring Wheat (Red Fife)	10.5	11.5	11.6	12.7	12.1
Emmer (Common)	10.0	10.8	11.0	12.4	11.6
Spring Rye (Dakota Mammoth)	17.1	11.9	17.8	11.7	11.8
Spring Wheat (Wild Goose)	6.5	7.5	9.4	9.7	8.6
Field Peas (Early Britain)	3.4	5.9	4.1	8.4	7.2
Hulless Barley (Guy Mayle)	12.3	8.6	13.0	9.2	8.9

Attention is drawn particularly to the fact that six-rowed barley, when sown in combination with other grain, exerts a very great influence in the yield of the crop. This quality of the barley is shown in the results of both methods of combination used in this experiment. A study of the table will show wonderful variations in the different kinds of grain in reproducing themselves when sown in combination with other kinds of crops. The hulless barley and the field peas have not been able to hold their own as well as the six-rowed barley and the oats.

In comparison with this experiment, it is well to draw the attention of the reader to another experiment which was conducted in a similar manner to the one here described, but in which twelve crops were grown together in duplicate in each of six years. The average results of the experiment in which twelve different crops were used in combination are presented in tabulated form, which appears as follows:

Varieties used in each Mixture.	Percentage of Grains in Mixtures.	
	Uniform weights of seed sown 6 yrs. 12 tests.	Quantities of seed in same proportion as when grown separately 6 years 12 tests.
Six-rowed Barley (Mandscheuri)	18.1	17.1
Spring Rye (Common)	13.3	14.1
Hulless Barley (Black)	12.5	14.2
Early White Oats (Alaska)	12.7	9.4
Black Oats (Joanette)	11.9	8.6
Emer (Common)	7.0	7.9
Hulless Barley (White)	5.8	6.9
Peas (Field)	4.4	7.6
Spring Wheat (Wild Goose)	4.8	6.3
Grass Peas	5.6	4.7
Vetches (Common)	2.3	1.9
Flax (Common)	1.8	1.3

Here again it will be seen that the six-rowed barley has exerted a very marked influence in determining the yield of the mixture. By taking both of these experiments into consideration, we get pretty strong evidence of the value of six-rowed barley and of oats in reproducing themselves even when sown in combination with a large number of other leading varieties and classes of farm crops. Emmer, although a comparatively large yielder when grown by itself, occupies only a medium position when grown with other crops. Field peas, although an admirable crop to sow along with oats for the production of green fodder or of hay, do not fill sufficiently well to produce a large yield when sown in combination with other crops, especially if those crops are barley and oats. The Banner oats, being a somewhat taller-growing variety than either the Alaska or the Joanette varieties, occupies a slightly higher place in the relative proportions of the different grains in the crop produced.

Equal Weights and Equal Measurements of Oats and Barley Grown in Combination.

In an experiment conducted at the College for the six years from 1889 to 1904 inclusive, in which nine different mixtures of oats and barley were grown in duplicate tests, it was found that a combination of one bushel (34 pounds) of oats and one bushel (48 pounds) of barley or a total of 82 pounds of mixture per acre produced the largest yield of grain. In 1907, a little experiment was started by comparing with this standard mixture another mixture consisting of 41 pounds of oats and 41 pounds of barley, or a total of 82 pounds of the mixed grain per acre.

The average results of the duplicate tests of this experiment conducted for the four years show that one bushel of oats and one bushel of barley by weight produced an average of 2,457 pounds of grain per acre, and that when 41 pounds of each were used in the mixture an average of 2,293 pounds of grain per acre were produced. In both of these experiments the barley exerted a greater influence than the oats in the yield of grain per acre. In no one test in any single year did the oats produce fifty per cent. of the mixed crop.

Different Varieties of the Same Class of Grain Grown in Combination.

Different varieties of winter wheat, of oats and of barley have been grown separately and in combination with the object of ascertaining whether or not there was any advantage of growing mixtures as against growing the varieties separately. The results of experiments conducted with growing winter wheat for five years and of barley and of oats each for four years show that the mixtures have given very similar results to the averages of the varieties when grown separately. In the case of barley, there was a very slight advantage from growing the varieties in combination, but in the case of both oats and winter wheat the average results of the varieties grown separately were slightly greater than the results from the same varieties when grown in combination. The results of our experimental work up to date, therefore, seem to strongly indicate that there may be a decided advantage from growing different classes of cereals together, but that there is no marked advantage from growing different varieties of the same class in combination.

Treatment for Loose Smut in Oats and Stinking Smut in Wheat.

Smut is a living plant. The spores of this fungus correspond to the seeds of the grain, and when they are sown together they both germinate. The spores produce thread-like tubes or stems which enter the young grain plants and which eventually reproduce the spores in the heads of the plants. It is therefore very important to kill all the spores of the smut and prevent further infection. If this is done, one treatment should prove effectual for several years.

For five years in succession, experiments have been conducted at the Ontario Agricultural College for the prevention of the loose smut in oats and of the stinking smut in winter wheat. Careful determinations have been made each year to ascertain the comparative influence of the different treatments. There were in all, seven treatments for oats and five treatments for wheat. In every instance, one sample was left untreated as a basis of comparison. The experiment was conducted in duplicate both with oats and with wheat each year, there being two varieties of each class of grain used for the experiment. The following treatments were used throughout with the exception that numbers 3 and 6 were omitted from the treatments for the stinking smut in wheat:

(1) *Untreated.* One sample of oats and one sample of winter wheat of each variety were left untreated, in order that the influence of the various treatments might be observed.

(2) *Immersion in Hot Water.* For this treatment, the grain was placed in a bag which was then immersed in water at about 115 degrees F. Soon afterwards it was placed in water which was kept at a temperature of between 130 degrees and 135 degrees F. The grain was occasionally stirred and was allowed to remain in the water for a period of fifteen minutes. It was then spread out on a clean floor to dry, where it was stirred occasionally.

(3) *Immersion in Bluestone Solution for Five Minutes.* For this treatment, a strong solution was made by dissolving one pound of copper sulphate (bluestone) in one gallon of water and then immersing the oats in the solution for a period of five minutes.

(4) *Immersion in Bluestone Solution for Twelve Hours.* In this treatment, the bluestone solution was made by dissolving one pound of bluestone in twenty-five gallons of water, and the oats were immersed in this solution for a period of twelve hours.

(5) *Sprinkling with Bluestone Solution.* The solution was made by dissolving one pound of bluestone in ten gallons of water, which was used for sprinkling over the oats until they were thoroughly moistened after being carefully stirred.

(6) *Immersion in Potassium Sulphide Solution.* The potassium sulphide treatment consisted of soaking the seed for two hours in a solution made by dissolving eight pounds of potassium sulphide in fifty gallons of water.

(7) *Immersion in Diluted Formalin.* The solution of formalin (formaldehyde) used for the immersion process was made by pouring one-half pint of the formalin into twenty-one gallons of water, and the seed oats were immersed in this solution and stirred occasionally for a period of twenty minutes.

(8) *Sprinkling with Diluted Formalin.* One-half pint of formalin was poured into five gallons of water. The oats were then sprinkled with this solution and carefully stirred until the grain was thoroughly moistened.

After the treatments had been made for a few hours, the grains were carefully sown on separate plots each of which was exactly twenty-five links long by twenty-five links wide. When the winter wheat was about ready to cut, it was carefully examined and the smutted heads were picked out and shelled. The rest of the crop was then threshed and again examined for the smut balls. When the oats were coming into head they were examined frequently and all smutted heads removed and carefully counted. The tables which follow give the average results in percentage of smutted grains of winter wheat and of smutted heads of oats in each of the five years during which each experiment was conducted. Besides this information, the average yield of oats per acre for the five years and the average yield of winter wheat per acre for three years are included.

TREATMENT OF OATS FOR SMUT.

Materials.	Percentage of Smut.						Average yield of grain per acre. 5 years.
	1st year.	2nd year.	3rd year.	4th year.	5th year.	Average of 5 years.	
							bus.
1 Untreated	5.5	3.9	11.6	4.3	3.4	5.7	60.3
2 Hot Water	.0	.0	.0	.1	.0	.0	63.7
3 Bluestone—5 minutes	1.7	.9	.7	.6	.1	.8	58.5
4 Bluestone—12 hours	.6	.0	.0	.1	.0	.1	56.0
5 Bluestone—Sprinkled	.9	2.0	1.4	.6	1.6	1.3	61.8
6 Potassium Sulphide	3.4	.1	.3	1.5	.7	1.2	66.2
7 Formalin—Immersed	.0	.0	.0	.0	.0	.0	68.3
8 Formalin—Sprinkled	.0	.1	.0	.0	.0	.0	61.3

TREATMENT OF WINTER WHEAT FOR SMUT.

Materials.	Percentage of Smut.						Average yield of grain per acre. 3 years.
	1st year.	2nd year.	3rd year.	4th year.	5th year.	Average of 5 years.	
							bus.
Untreated	3.6	9.3	.6	.6	6.8	4.2	38.0
Hot Water	.0	.0	.0	.0	.0	.0	40.6
Bluestone—12 hours	.0	.0	.0	.0	.0	.0	40.2
Bluestone—Sprinkled	.0	.2	.0	.0	.1	.1	41.1
Formalin—Immersed	.0	.0	.0	.0	.0	.0	43.3
Formalin—Sprinkled	.0	.0	.0	.0	.0	.0	36.3

The results of all the experiments show that the greatest yields of both winter wheat and oats per acre were produced from the grain which was immersed in a solution made by adding one pint of formalin to forty-two gallons of water for a period of twenty minutes. It will also be seen that this treatment was, in fact, the most effectual of all the treatments in completely preventing the trouble from the smut. Of the different bluestone treatments for smut in oats the most effectual was treatment No. 4, but that treatment, however, was not as satisfactory as the use of the formalin solution in which the grain was immersed. It will also be noticed that No. 3 and No. 4 treatments seem to injure the germination of the grain slightly; they thus reduce the yield per acre. It will also be noticed that the sprinkling with the formalin treatment reduced the yield of winter wheat per acre, the average being nearly two bushels per acre less than the crop produced from the untreated seed. The results of all these experiments go to show the excellent satisfaction which has been obtained by immersing both oats and winter wheat for twenty minutes in a solution made by mixing one pint of formalin with forty-two gallons of water. This treatment is easily applied, comparatively cheap, effectual in killing the smut spores, and also effectual in producing the largest average yield of both wheat and oats per acre of all the treatments used.

The Vitality of Smut Spores in Oats.

For two or three years, an experiment was conducted in duplicate by sowing each of two varieties of oats, the seed being of all ages. The grain contained smut spores and was not treated. The idea of the experiment was to ascertain whether or not the smut spores would lose their vitality more quickly than the oat grains. For this experiment, therefore, seed which was one year and two, three, four, and five years old was selected for the test. It was found, however, that instead of the smut decreasing with age, that the older the grain the greater was the proportion of smut. This seemed to indicate that the smut spores remained vital when stored with the grain in a dry place for at least five years. It also seemed to indicate that owing to the weakened condition of the oat plants caused by the age of the seed, it enabled the smut to attack the weakened plants quite readily. It therefore appears to be useless to attempt to try and eliminate the smut from grain by the use of old seed.

Differences of Varieties in Their Susceptibility to Smut.

At one time the writer considered that variety exerted but slight influence with regard to the amount of injury caused by the loose smut in oats or the stinking smut in wheat. From recent observations, however, it seems very evident that some varieties are decidedly more susceptible than others to the attacks of smut. During the years 1902, 1903, 1904, and 1905, we did not treat our varieties of oats for smut, but carefully picked out all smutted heads each year and kept an accurate record of the amounts of smut produced in the different varieties. The difference in the different varieties was very marked. In the spring of 1906, however, the varieties were all carefully treated by immersing the seed for twenty minutes in a solution made from one pint of formalin and forty-two gallons of water. In each of the past five years no treatment of the seed of these varieties has taken place. The following table gives the number of smutted heads taken from a plot 10 links wide by 100 links long from each of six different varieties of oats in each of the past nine years:

Variety.	Before Treatment.				After Treatment.				
	1902	1903	1904	1905	1906	1907	1908	1909	1910
Early Ripe	0	0	3	0	0	0	0	0	0
Joanette	20	9	10	18	0	2	12	1	0
Siberian	32	43	78	20	0	1	0	0	5
American Banner	116	303	317	22	0	3	2	4	5
Black Tartarian	332	608	369	62	0	3	12	15	29
Early Champion	634	380	1244	166	0	11	9	5	6

The tabulated results here presented show in a very marked degree the differences in the varieties in their apparent susceptibility to smut and the effectuality of the treatment in destroying the smut which increases after treatment only slightly from year to year. When the oats are grown on one farm, however, and the threshing machine comes from another farm where the smut is very bad, it is almost sure to bring smut spores with it and thus to contaminate the oats, even though the seed had been treated in the spring previous. In order to keep the varieties of oats comparatively free from smut, therefore, it is necessary to treat occasionally and to watch carefully that smut spores are not introduced in considerable quantities from one farm to another.

While it is true that the amount of smut varies with the different varieties, it will also be noticed that there is a considerable difference in the amount of smut produced in different seasons. Some years the conditions are much more favorable for the development of smut than in other years.

The Early Ripe variety is the earliest oat amongst some two hundred and sixty varieties which we have grown in the experimental grounds, but the grain is long and slender, giving a rather light weight per measured bushel. From our experiments with this variety, it seems evident that it is immune to the attacks of smut. It is true that there were three smut heads found in 1904, but when it is considered that fully 17,000 grains of oats are sown in each plot, it is quite likely that the three smutted heads were all from one plant produced from a seed of some other variety which, by means of manure or some other way, got into the plot. We have introduced some spores with the seed of the Early Ripe variety before seeding, but have found the variety to be immune to the attacks therefrom. The resistance of some varieties to the attacks of smut shows the importance of further study along this line with the object of securing either through selection or through hybridization important varieties of oats and of wheat which may be practically immune to the attacks of smut.

Varieties of Spring Barley.

After the passing of the McKinley Tariff in 1890, there was a decrease in the acreage of barley in Ontario until 1898, at which time there were only 438,784 acres used for this crop in the Province. From that time forward, however, there has been a considerable increase in the barley crop of Ontario. According to the reports of the Bureau of Industries for Ontario, we learn that in recent years there has been an increase not only in the number of acres devoted to the barley crop in this Province, but there has also been an actual increase in the average

yield of barley per acre. The following table gives the average number of acres of barley and the average yield of barley per acre in Ontario for each of three eight-year periods:

Eight Year Periods.	Average Number of Acres of Barley.	Average Yield of Barley in Bushels per Acre.
1886 to 1893	686,859	24.0
1894 to 1901	502,223	27.1
1902 to 1909	733,608	31.0

It will be seen from the figures here presented that the average yield of barley per acre for the eight years from 1902 to 1909 is fully 29 per cent. greater than the average yield per acre for the eight years from 1886 to 1893. In the first period referred to the yield per acre varied from 21 to 29.2 bushels, and in the last period from 27 to 34.3 bushels. With only one exception, the lowest yield per acre during the past eight years was greater than the yield per acre in any one of the eight years of the first period. From the results here presented, it seems very evident that during the last twenty-four years there has been a considerable increase in the average yield of barley per acre throughout the Province. This increase has been due, in no small degree, to the introduction, distribution, and general cultivation of better varieties of barley than were grown previously.

AVERAGE RESULTS OF VARIETIES OF BARLEY FOR FIVE YEARS.

Classes and Varieties.	Bearded or Beardless	Color of Grain.	Average Height.	Per cent. of Rust.	Days to reach maturity.	Weight per measured bushel.	Yield per acre.	
							Straw.	Grain.
SIX-ROWED:			Ins.			Lbs.	Tons.	Bush.
Mandscheuri	Be.	White	38	3	105	50.13	2.21	84.40
California Brewing	Be.	White	32	8	106	46.43	2.03	80.73
Oderbrucker	Be.	White	38	4	104	50.40	2.07	76.69
Common six-rowed	Be.	White	38	3	103	50.78	1.99	72.22
Mensury	Be.	White	36	4	103	51.56	2.07	71.20
Zulu King	Be.	Black	29	8	104	49.33	1.59	64.46
Success	Ba.	White	36	4	97	47.30	1.64	58.75
Ohio Beardless	Ba.	White	39	6	101	45.31	1.85	56.87
TWO-ROWED:								
Imported No. 5,591 (Iowa)	Be.	White	33	4	111	52.60	2.22	69.08
Hanna No. 5,590 (Iowa)	Be.	White	34	4	109	53.28	2.08	66.63
Jarman's Selected Beardless	Be.	White	33	4	110	53.14	2.13	66.17
French Chevalier	Be.	White	34	6	116	51.39	2.16	55.28
Two-rowed Canadian	Be.	White	35	6	111	52.50	2.09	51.21
Duckbill	Be.	White	35	6	111	51.55	1.99	48.08
HULLESS:								
Purple	Be.	Purple	27	4	102	62.99	1.80	47.53
Guy Mayle	Be.	Green	26	4	100	60.33	1.78	46.87
Black Hulless	Be.	Black	30	5	103	62.23	1.79	45.56
Winnipeg No. 2	Be.	White	26	4	104	59.40	1.93	45.08
Hungarian	Be.	White	32	5	107	59.25	1.86	42.81
New White Hulless	Ba.	White	29	9	109	59.53	2.17	32.89

The two-rowed barleys are grown very extensively in a number of the European countries. In Ontario, however, the six-rowed varieties are used almost

entirely. Our experiments at Guelph, the co-operative experiments throughout Ontario and the experience of farmers generally, point to the greater success of the six-rowed barleys as larger yielders of grain than the two-rowed varieties of barley which have been obtained from various parts of the world. A large number of different varieties of six-rowed, two-rowed, and hulless barleys obtained from various countries have been carefully tested in our experimental grounds. Practically all varieties have been grown for at least five years in succession, after which period the poorer varieties have been dropped and those making the most satisfactory returns have been retained for further experimental work. New varieties have been added from time to time until our information regarding the productiveness of the different varieties of the different classes of barley is fairly complete. There are now very few varieties of barley in America which we have not had in our comparative tests.

It should be remembered that a very large number of varieties of barley which have given comparatively low yields per acre have been dropped from our lists after five years' tests. Even in spite of this, however, it will be seen that there are great variations in the average yield of grain per acre. Six of the varieties of six-rowed barley possessed beards, and the other two here reported are beardless. It will be noticed, however, that the two beardless or bald varieties are at the bottom of the list in average yield of grain per acre. The highest yielding beardless variety gave an average yield of 27½ bushels of grain per acre per annum less than that produced by the Mandscheuri bearded six-rowed variety when grown under similar conditions. It should be understood that for both the six-rowed and the two-rowed barleys, 48 pounds per measured bushel was used as the standard, but for the hulless barleys, 60 pounds per measured bushel was taken as the standard. Hull-less barleys somewhat resemble spring wheat, and being deprived of the hull give a much heavier weight per measured bushel than either of the other two classes.

Twenty-one years ago last spring, one pound of the Mandscheuri barley, which was obtained from Russia through an English seed firm, was sown on a small plot in the experimental department to be tested with sixty other varieties. In the test of that year it gave comparatively stiff straw and a large yield of grain which was of good feeding quality, being fairly thin in the hull and plump in the grain. It has continued to give good results since that time, the average for the twenty-two years, during which time it has been under experiment, being 73.3 bushels per acre per annum. This is an average of 9.5 bushels per acre per annum more than the Common Six-rowed barley grown under similar conditions. In connection with the Ontario Agricultural and Experimental Union, the Mandscheuri variety has been distributed throughout Ontario during the past seventeen years to farmers who have applied for the experiment with barley. From these small lots so distributed, there are now upwards of a half a million acres of the Mandscheuri barley grown in Ontario annually. The introduction of this variety has undoubtedly had a marked influence in increasing the yield of barley per acre throughout Ontario during the last few years, as referred to in a previous paragraph.

O.A.C. Number 21 and Other New Varieties of Barley.

While it is true that the Mandscheuri barley has had a wonderful influence in barley production in Ontario, and is now grown to the exclusion of practically all of the old varieties, it is being supplanted by what is known as the O.A.C. Number 21, which was originated by us through selection from an individual

plant. In the spring of 1903, 9,972 selected grains of the Mandscheuri barley were planted by hand at equal distances apart in the Experimental Department at the College. When the plants were ripe, they were carefully examined and 33 of the most promising ones were selected, harvested, and threshed separately. In 1904, these 33 lots were sown separately in rows, and these rows were carefully examined and the most important ones were harvested and threshed separately. From that time forward, only the best strains were grown in the tests as follows: 14 in 1905, 8 in 1906, 7 in 1907, and 3 in each of the past three years. During the first year, the different strains went by numbers, and the one which has proven to be the best is what is now known as the O.A.C. Number 21. This variety was distributed throughout Ontario in connection with the Experimental Union and has made a very excellent record. In each of the past four years it has actually given better results than the Mandscheuri variety in yield of grain, in freedom from rust, and in both length and strength of straw in the co-operative tests throughout Ontario. It is quite an easy matter to distinguish the grain of the O.A.C. Number 21 from that of the Mandscheuri variety.

In the spring of 1909, about 20,000 bushels of the O.A.C. Number 21 barley were traced in Ontario as the result of the pound lots which were distributed for experimental purposes in connection with the Experimental Union. We are pleased that this method of distribution of choice seed of select varieties for the co-operative experiments is having such an influence on the crop production throughout the Province. Experimenters find for themselves, through the experiments, which varieties are most suitable for their own particular soils. The crop produced from the most promising variety is carefully sown in the following year, and in this way the variety is rapidly increased, not only to be used by the farmer himself, but as a source of seed in the neighborhood. We believe that the O.A.C. Number 21 barley is the best variety which is now being grown on the farms of Ontario, and that in a very short time it will be under pretty general cultivation.

Attention should also be called at this time to a selection of the Guy Mayle hulless barley, which was obtained in a similar manner to that of the O.A.C. Number 21. This new selection of the Guy Mayle now occupies the highest place in average yield of grain per acre of all the hulless barleys which have been grown at the College for a period of five years. This new strain of hulless barley, which was originated from an individual plant, besides being a large yielder is very uniform in its growth and weighs about one-half pound per measured bushel more than the variety from which it was selected. We hope to soon include this new barley in our co-operative experiments throughout Ontario.

Besides the work in selection, we have been doing a good deal in the cross-fertilization of barley with the object of combining the good qualities and eliminating the undesirable characteristics of the parent varieties. Although we have not as yet distributed nor will be ready to distribute for probably a couple of years any of our new hybrid barleys, yet we are very much encouraged in the possibility of securing, through hybridization, some new varieties of barley of outstanding merit. A six-rowed barley with long, stiff straw and of handsome appearance has been produced which ripens about eight days later than any of the other varieties of six-rowed barley. The object in securing this barley has been to obtain a productive variety with a long, stiff straw which could be mixed and grown satisfactorily with some of our standard varieties of oats, such as the Siberian or the Banner. We have found by experiments conducted over a series of years that suitable varieties of barley and oats, when mixed in the right proportions, have produced upwards of 200 pounds of grain per acre more than either of the grains

when grown separately. In the past it has been necessary to use an exceptionally early ripening variety of oats to grow with a standard variety of barley. If the hybrid here referred to will prove satisfactory, as it promises, it will fill an important place in the agriculture of Ontario, as we now grow about one-half million acres of mixed grains annually. In 1910, we had one hundred different selections of this new hybrid barley which we are studying with the object of increasing as much as possible the yield per acre of this new hybrid.

In each of the past three years, we have been testing out in our regular plots some of our other new hybrid barleys, and find that two of them considerably surpassed in yield per acre the Mandscheuri variety. We are, however, studying these carefully in order to be sure that all the important characters will reproduce themselves constantly and satisfactorily.

Varieties of Winter Barley.

Of the two varieties of winter barley tested in each of the past four years, the greatest yield has been produced by the Tennessee winter variety, the average being 52.8 bushels of grain per acre. One variety of winter barley has been grown at the College for fourteen years and has given an average yield of 56.1 bushels of grain, and has produced grain which weighed 46.9 pounds per measured bushel. Winter barley is not quite as hardy as winter wheat, but when it survives the winter it usually gives a large yield of both straw and grain per acre. Within the past seventeen years the winter barley has been completely killed out on three occasions. It will therefore be seen that there is a considerable amount of risk in growing winter barley in Ontario. It is possible, however, that in time some hardy variety may be developed which will withstand our severe winters. Under present conditions, however, there is no winter barley that has given as good satisfaction for Ontario as the O.A.C. Number 21 spring variety.

Varieties of Oats.

Of all the cereals grown in Ontario, oats occupy decidedly the highest place in annual acreage. In fact, the number of acres devoted to the oat crop in Ontario annually is almost equal to the combined areas devoted to all of the other small grains. With the exception of 1907 and 1908, the number of acres of oats in Ontario in 1910 was greater than that of any one of the past twenty-eight years. In 1907, the acreage was exceptionally large, being about 200,000 acres more than any one year previous or since that date. The crop for that year, however, was unusually poor in the Province and in two years' time the acreage dropped 237,000 acres. In 1910, as compared with 1909, however, there was an increase of a little more than 60,000 acres.

Although we learn from a study of the Report of the Bureau of Industries for Ontario that barley would yield on an average 120 pounds of grain per acre more than oats, and that barley produces more digestible protein and digestible carbohydrates than do oats, yet we realize the fact that the oat crop is a popular one in this Province. This may be accounted for largely from the fact that oats can be grown on a great variety of soils and that they produce a large amount of straw. Some people object to the growing of barley owing to the beards which it possesses.

As the oat crop is such an important one in Ontario, much attention has been given in the testing of varieties and the conducting of other experiments in the department of Field Husbandry at the College. About three hundred varieties of oats have been carefully tested in the Experimental grounds, but many of these

have been dropped after they have been grown for five years in succession, owing to the fact that other varieties have proven more successful. Each year, a few new varieties are added and a few of the more inferior kinds are dropped. In 1910, no less than ninety-two kinds of oats were under test, including named varieties, selected strains, and new hybrids. Of this number, however, thirty-seven named varieties were grown in 1910 for at least five years in succession. It is practically impossible to give the results of these varieties so that the reader can glean the desired information except through the presentation of the results in tabulated form.

AVERAGE RESULTS OF VARIETIES OF OATS FOR FIVE YEARS.

Varieties of Oats.	Average Results for 5 Years.							Yield per Acre of Grain.	
	Per cent. Hull. 4 Years.	Heads, Mane or Spreading.	Days to Mature.	Height.	Per cent. Rust.	Weight per measured Bushel.	Straw per Acre.	1910.	Average 5 Years.
				ins.		lbs.	Tons.	Bushels.	Bushels.
Daubeney	24.7	S.	105	41	7	34.44	1.83	87.00	**87.44**
Alaska	23.1	S.	104	43	7	35.28	1.87	89.79	**86.40**
Iowa Silver Mine	31.1	S.	111	44	9	33.03	2.03	108.56	**86.09**
Siberian	29.5	S.	110	45	10	31.04	1.98	89.15	**86.02**
Peerless	27.4	S.	112	45	11	33.80	2.21	103 44	**85.70**
Early Champion	27.8	S.	109	45	10	33.66	1.93	93.38	**83.83**
Prosperity	25.9	S.	106	43	8	33.78	2.03	96.26	**83.10**
Newmarket	28.3	S.	111	45	11	33.74	1.94	91.47	**80.73**
Abundance	28.4	S.	111	45	8	33.57	1.97	107.21	**80.63**
English Glory	27.8	S.	111	45	9	33.93	2.05	73.03	**80.43**
Imported No. 534 Iowa	27.4	S.	111	45	9	33.75	1.94	96.18	**79.88**
Rennie's White Irish	28.1	S.	111	44	9	33.61	1.93	97.79	**79.81**
Oderbrucker	30.0	S.	113	45	10	33.78	2.05	96.74	**79.78**
Joanette	24.2	S.	110	37	6	32.87	2.26	94.76	**79.63**
Probsteier	27.7	S.	112	45	10	33.84	1.92	96.59	**79.27**
Ligowa Hafer	28.0	S.	111	44	10	34.11	1.89	85.91	**78.68**
Early Ripe	26.3	S.	101	40	7	28.47	1.87	89.79	**77.86**
Waterloo	26.7	S.	113	44	8	32.85	1.95	79.76	**77.61**
New Sensation	28.4	S.	111	43	10	33.54	1.90	105.32	**77.35**
Yellow Russian	29.1	S.	112	43	8	33.08	1.86	69.62	**76.79**
Swedish Wisconsin No. 4	28.5	S.	111	45	11	33.24	1.90	90.41	**76.54**
New Zealand	29.4	S.	113	43	9	32.04	2.01	73.79	**76.52**
Vick's American Banner	29.0	S.	113	45	10	34.03	2.11	73.62	**76.46**
Empire	29.5	S.	111	43	10	33.64	1.76	67.00	**76.10**
Liberty	29.5	S.	113	43	9	32.93	1.97	79.32	**75.96**
Egyptian	30.6	M.	112	45	11	35.27	2.26	91.68	**74.66**
Bavarian	28.8	S.	112	44	6	34.29	2.02	76.41	**72.27**
Pioneer	36.6	S.	110	40	12	33.79	2.14	96.71	**71.55**
Derby	27.1	S.	111	42	9	34.74	1.74	74.15	**70.95**
Dodd's White	33.4	M.	112	44	9	33.78	2.04	97.15	**69.88**
Black Tartarian	29.8	M.	116	42	14	30.84	2.09	60.47	**69.42**
Tartar King	32.5	M.	110	45	11	33.59	1.89	77.00	**68.45**
Early Dawson	34.6	S.	107	46	12	37.61	2.23	81.56	**66.73**
Storm King	34.2	M.	111	42	9	33.72	1.89	60.38	**66.11**
Early White Jewel	32.6	M.	112	44	9	34.87	1.73	67.82	**63.51**
White Superior Scotch	33.6	S.	107	47	12	38.22	2.15	79.50	**62.29**
Hulless Oats	—	S.	110	47	7	—	2.67	59.21	**47.44**

A study of the tabulated results on varieties of oats here presented shows very clearly that even among these leading varieties there is a marked difference in the different kinds in their various characteristics. In the average of four years' determinations of the percentage of hull, it will be seen that there is a variation from 23.1 for the Alaska to 36.6 for the Pioneer. Not many people realize that there is such a marked difference in the quality of oats, owing to variety. The Pioneer is one of the varieties of oats introduced by the Garton Bros. of England in recent years, and yet it possesses the thickest hull of all the varieties here reported, giving on an average 13.5 pounds more hull per hundred pounds of grain than the Alaska variety. It will also be noticed from a study of these figures that some of the heaviest weighing grains per measured bushel are comparatively light yielders and furnish grain of rather poor quality, as indicated by the large percentage of hull. It will also be observed that the twenty-five varieties which stand the highest in yield of grain per acre have spreading heads, and that the six varieties with the mane or side heads are amongst the twelve lowest yielding varieties on the list. The Daubeney and the Alaska varieties seldom appear at our leading exhibitions, as the oats are not as plump and thick and attractive in appearance as some other varieties, and yet these are two of the highest yielding varieties, and two out of the three of the thinnest hulled varieties of those here reported. The Daubeney variety is a very early oat and possesses straw of medium height and white grain of excellent quality. It is a particularly valuable variety to mix with the Mandscheuri barley when it is desired to sow these two grains in combination, as they will mature at practically the same time. The Alaska variety of oats is also very early in reaching maturity, being in fact one day earlier than the Daubeney variety and only three days later than the Early Ripe, which is the earliest maturing kind of oats that we have grown at the College. The Alaska produces straw a little taller than the Daubeney and one which usually stands very well. The grain is white in color, is a little higher than the standard in weight per measured bushel, and is exceedingly thin in the hull. The Alaska would also be a very suitable oat for mixing with either the Mandscheuri or the O.A.C. Number 21 barley for growing the two in combination. The Siberian variety possesses very good straw and is a large yielder of grain, and of medium length of straw. It is, however, some five days later in reaching maturity than the Daubeney. The American Banner has not been doing quite so well during the last few years as formerly, as it now stands twenty-third in the list in yield of grain per acre. It is probably safe to say that the two varieties of oats most extensively grown in Ontario at the present time are the Vick's American Banner and the Siberian.

Selected Strains and New Hybrid Oats.

Much has been done at the College recently in trying to improve some of the leading varieties of oats through selection and through cross-fertilization. For the work of selection, thousands of seeds of each of a few varieties have been planted by hand, and new strains have been started from the very best individual plants.

The greatest yield of oats per acre obtained in 1910 was from a selection originally made in this way from the Joanette variety. A selection made from the Siberian oats has surpassed the original variety in yield of grain and in yield of straw per acre in each of the past four years. It has also been taller and stiffer in the straw and slightly freer from rust.

In 1909, the greatest yield of all the oats under test was obtained from a hybrid produced at the College by crossing the Joanette and the Siberian oats.

The thinnest hulled grain which has been secured during the past three years has also been obtained from a hybrid originated by us.

While it is true that none of these selected strains or hybrids have as yet been distributed throughout Ontario, we hope before long to have the characteristics of some of these new kinds so constant in their appearance that we will have confidence that we have secured new varieties which are better suited for Ontario than the leading varieties which are now extensively grown throughout the Province.

Five years ago we secured samples of the Yellow Kherson and the Sixty-Day varieties of oats from an agricultural college in one of the western states. We grew these the first year in the condition in which they were obtained, but found that there was a great mixture of both white and yellow kernels. We carefully selected by hand some of the best seeds of the white oats and some of the best seeds of the yellow oats and have grown them separately and find that they are reproducing true to color. These have all proven to be heavy yielding strains and are amongst the most promising of the new varieties which have been introduced.

The Stooling Properties of Oats.

There appears to be but little definite information regarding the stooling or the tillering of cereals as a factor in determining the amount of seed thus required per acre in order to give the best results. While it is true that the stooling of the cereal plants is influenced by the fertility of the soil, the conditions of the weather, etc., it is also true that it is influenced by the variety of the grain and by the thickness of the sowing. The fertility of the soil, the thickness of the sowing, and the varieties used are largely under the control of the farmer. Therefore, the stooling or the tillering of the grain crops forms an exceedingly important subject for study and investigation. Outside of some work conducted in the State of Wyoming, I can find but little trace of any valuable experiments along the line of the stooling of grain in America. As the result of our own investigations in 1909 and 1910, the varieties of oats showed very marked differences in stooling properties. In order to illustrate this point more clearly, we here enumerate a few varieties which show marked variations in their stooling properties, and we give the average number of stools per plant in each of the past two years. The plants of each variety in this special test were one foot apart each way.

Varieties.	Average Number of stools per plant. (2 years.)	Varieties.	Average Number of stools per plant. (2 years.)
Joanette	20	American Banner	14
Burt	18	Siberian	13
Early Ripe	16	Abundance	11
Yellow Kherson	16	Storm King	7
Daubeney	15	Tartar King	7
Sixty Day	15	Early White Jewel	6

It will be seen that there is a variation in the average number of stools per plant from six, in the case of the Early White Jewel, to twenty-two in the case of the Burt. The Regenerated Abundance which, I understand, is pronounced a non-stooler by the introducers, we find by experiments conducted at Guelph will give almost exactly the same number of stools per plant as the American Banner

variety. The results for the Regenerated variety, however, are not included in the tabulated form here presented, as it was not tested under exactly uniform conditions with the other varieties in 1909.

An experiment has been conducted in our experimental plots in each of the past two years by planting the seed of each of five varieties of oats at different distances apart. No less than one hundred and five plots were used for this experiment in each of the past two years. We are not yet prepared to give the details of this experiment, particularly as the results for 1910 are not yet completed. It might be stated in a general way, however, that those varieties of oats which are comparatively heavy stoolers appear to adapt themselves better to varying conditions than those which are very light stoolers. We hope to repeat these experiments again in 1911 and believe that some very valuable information of a practical nature will be obtained from the results of experiments in this line of investigation.

Quality of Oats as Determined by the Amount of Hull.

On examining the chemical analyses of different varieties of oats, marked variations in the quality of the grain are observed. It is found, however, that these variations are largely due to the percentage of hull in the oats. The amount of hull in the oats, therefore, is the great regulator in regard to the quality of the grain. In order to get a fairly good knowledge therefore of the quality of oats it is not necessary to make a chemical analysis, but simply to make a determination of the amount of hull. This can be accurately done by weighing a certain number of kernels and then weighing the hulls after they have been removed from the grains. It is, however, not always necessary to make these accurate determinations, but a casual observation and simple examination of the kernels will enable one to ascertain fairly well the relative amounts of hull contained in different samples. Not only are there very great variations in the amount of hull in different varieties of oats in a single year, but it is found that the relative percentage of hull in different kinds of oats is fairly constant from year to year. A variety, for instance, which shows itself to be thin in the hull for two or three years is almost sure to be comparatively thin in the hull over a longer series of years. This is also true with those varieties of oats which have a large amount of hull. In order to illustrate this point, a table is here presented which gives the exact percentage of hull of each of four varieties of grain in each of the past nine years:

Varieties.	Percentage Hull.									
	1902	1903	1904	1905	1906	1907	1908	1909	1910	Aver. 9 yrs.
Joanette	22.5	23.1	22.5	24.0	25.2	23.4	23.9	25.4	23.9	**23.8**
Daubeney	26.1	25.1	23.0	26.3	26.3	24.7	23.8	25.4	24.9	**25.1**
Early Dawson	32 6	33.7	32.4	36.0	38.1	33.7	36.6	36.8	31.4	**34.6**
Pioneer	48.1	36.8	36.9	36.8	42.8	38.8	37.4	36.7	33.5	**38.6**

It will be seen from these results that there is a variation in average percentage of hull from 23.8 per cent. for the Joanette to 38.6 per cent. for the Pioneer. One hundred pounds of the Joanette, therefore, would produce an average increase of meal over that produced from one hundred pounds of the Pioneer variety by 14.8 pounds.

It will also be seen that while the percentage of hull of each variety varies somewhat according to the year in which it was grown, there is in almost every instance the same relative order in amount of hull of the different varieties. In every single year did the Pioneer have upwards of 9 per cent. more hull than the Joanette variety. The highest percentage of hull of the Joanette oats in any one year was 25.4, and the lowest percentage of hull of the Pioneer oats in any single year was 33.5. It will therefore be seen that the highest percentage of hull in the Joanette was 8.1 per cent. lower than the lowest percentage of hull in the Pioneer. The amount of hull in oats is an exceedingly important factor which many people entirely ignore. Some of the new varieties of oats which have been recently introduced and which are grown quite extensively in some sections are of comparatively poor quality, owing to the large amount of hull which they contain. In connection with this statement, I might refer to the Early Dawson, the Storm King, the Dodd's White, and the Tartar King as striking examples. In 1910, there were 102,084,924 bushels of oats grown in Ontario. This would mean 3,470,887,416 pounds. For every increase of one per cent. in the amount of hull, therefore, there would be a reduction in valuable part of the oat crop of Ontario of 34,708,874 pounds, or of 17,354 tons. These figures are simply submitted as being very suggestive and to arouse the reader to do some thinking along this line. If every one per cent. in the amount of hull of oats makes a difference of over seventeen thousand tons of the most valuable part of the grain, I leave it to the reader to reckon out the great differences caused through the variations in the amount of hull produced by different varieties. I would then suggest that he make an examination of his own oats to ascertain whether or not he is obtaining as much valuable food constituents per acre from his oat crop as he might if he were using better varieties. When you consider along with this the fact that some of the largest yielding varieties are also some of the thinnest hulled sorts, we most earnestly appeal to the farmers to look into this matter very carefully, as it opens up a study of much interest, and when once carefully looked into is almost sure to lead along more profitable lines of work.

STRENGTH OF STRAW OF OATS.

Varieties.	Percentage lodged three weeks before ripening.		Percentage lodged when ripe.	
	1910	Average 4 years.	1910	Average 4 years.
Siberian	0	24	95	84
Golden Beauty	0	25	98	85
Liberty	0	8	75	43
Sheffield Standard	0	16	68	85
Banner	0	8	87	63
Tartar King	0	9	65	82
Daubeney	0	30	74	62
Early Champion	0	17	96	63

A special study has been made during the last four years of the strength of straw of some of our prominent varieties of oats. While it is true that we take careful notes of the percentage of each crop which lodges each year in the general experiments, it does not give us as good an opportunity for making careful tests

of the strength of straw of the different varieties as when a special experiment is made with this one object in view. We have, therefore, in each of the last four years selected a few varieties which we have sown side by side and in duplicate on comparatively low land, and each variety has been sown at the rate of two and of four bushels per acre in order to obtain the desired information.

In a study of this table it must be remembered that these oats were sown on low land where conditions were favorable for them to lodge quite badly. We find through this special experiment, as we have in our more general test, that the Liberty variety of oats possesses straw of excellent quality. Not only does this variety usually stand up well, but the oats are comparatively free from rust and have that elasticity about them which prevents the straw from breaking as much as it does in some of the other varieties. The Tartar King variety, on the other hand, has a straw entirely different from that of the Liberty oats. The former variety produces straw which is coarse and upright in growth, but which at the time of ripening becomes very brittle, especially if the conditions of the soil or the weather are at all unfavorable. When this variety lodges, the straw usually bends at right angles and very frequently breaks, so that the crop lies very flatly on the ground and it is difficult to harvest. The Siberian variety, when grown under average conditions, usually holds an intermediate place for strength of straw amongst all the varieties under test; in fact, it is usually a little stiffer in the straw than the average. In 1910, however, the Siberian lodged rather more and the Tartar King considerably less than usual.

The Growing of Wheat in Ontario.

Although the tendency in Ontario has been to decrease the acreage devoted to the growing of wheat, we notice a slight exception to this rule with winter wheat during the last two years. In 1909, there were 663,375 acres and in 1910 there were 743,473 acres used for the winter wheat crop. With this and one or two other slight exceptions, however, the decrease in the acreage of winter wheat has been fairly constant during the past ten years, the reduction during that time being about 300,000 acres. In the case of spring wheat during the past twelve years, there has been a decrease every single year when compared with the year previous. In 1899, there were 398,726 acres, and in 1910, 129,319 acres used for spring wheat in Ontario. Owing to the increase of the live-stock industry in this Province, to the competition of the Canadian northwest and other wheat growing countries, and to other reasons, it is quite unlikely that the area devoted to wheat in this Province will be increased to that of twenty-five and thirty years ago for some time to come, at which period the area devoted to wheat was greater than that used for any other grain crop in the Province.

According to some authorities, there are seven, and according to other authorities there are eight, distinct types or species of wheat when judged from a botanical standpoint. We have, in the past, been adhering to the classification which includes the seven types. I present this classification, as it will give the reader a better understanding of a number of varieties which are now grown throughout the Province. The species are as follows:

(1) Common, fine, or soft wheat (*Triticum vulgare*).
(2) Turgid, or toulard wheat (*T. turgidum*).
(3) Hard, or flinty wheat (*T. durum*).
(4) Polish wheat (*T. polonicum*).
(5) Spelt (*T. spelta*).

(6) Emmer, or starch wheat (*T. dicoccum*).

(7) One-grained wheat (*T. monococcum*).

All of these different types of wheat are represented by varieties which have been grown in the plots at the Ontario Agricultural College, and at least three of them, viz., (1), (3) and (6) are grown considerably in field cultivation throughout the Province.

For practical information it seems best, however, to report on the wheats under a more popular classification than the one previously presented. The greater number of wheats of both the winter and the spring varieties which are grown in Ontario belong to the first class and are used very largely for the production of flour. Other wheats which are grown and are sometimes shipped to Southern Europe for the manufacture of macaroni belong mostly to types (3) and (4), and the wheat which is grown more particularly for the production of feed for farm stock belongs to types (5) and (6).

Varieties of Winter Wheat.

About two hundred and sixty-five varieties of winter wheat have been grown at the Agricultural College within the past twenty-one years. All varieties have been carefully tested for a period of five years, after which the inferior kinds have been dropped, and the most promising sorts have been continued in future tests. In 1910, forty-three varieties, besides a number of selections and hybrids, were under experiment. Of this number, twelve varieties have been grown for less than five years, and thirty-one for five years or over. As each of fourteen varieties have been grown for at least fifteen years, the average results of these are of special value. The following table gives for each of these fourteen varieties the average weight per measured bushel for fourteen years, the yield of grain per acre for 1910, and the average yield of both straw and grain per acre for the fifteen-year period.

Variety.	Color of Grain.	Pounds per measured bushel. 14 years.	Yield per acre.		
			Bushels Grain, 1910.	Average 15 years.	
				Tons Straw.	Bushels Grain.
Dawson's Golden Chaff	White	60.2	43.7	3.1	54.0
Imperial Amber	Red	61.1	49.5	3.4	49.6
Early Genesee Giant	White	60.5	35.8	3.2	49.4
Early Red Clawson	Red	59.4	48.5	3.0	48.1
Egyptian Amber	Red	61.8	42.6	3.4	48.0
Rudy	Red	61.5	44.9	2.8	46.3
Tasmania Red	Red	61.9	49.0	3.1	45.0
Geneva	Red	62.5	42.8	3.1	44.9
Kentucky Giant	Red	61.6	48.1	3.0	44.9
Turkey Red	Red	61.7	46.9	2.9	44.8
Tuscan Island	Red	61.2	42.5	3.1	44.3
Treadwell	White	60.9	34.5	3.0	43.9
Bulgarian	White	61.1	32.0	2.9	43.6
McPherson	Red	62.1	38.4	2.8	42.7

The average results of the fourteen varieties are as follows: Weight per measured bushel, 61.8 lbs. for 1910 and 61.3 lbs. for the fifteen-year period; and yield of grain per acre, 42.8 bushels for 1910 and 46.4 bushels for the fifteen-year period. It will therefore be seen that in the experiments at the College in 1910,

the winter wheat gave a yield per acre slightly below the average, but grain of good quality, being slightly heavier in weight per measured bushel than the average of the last fifteen years.

The Dawson's Golden Chaff, which stands the highest in average yield of grain per acre of the fourteen varieties grown in each of fifteen years, produces a very stiff straw of medium length, beardless heads with red chaff and white grain, somewhat soft but about the standard in weight per measured bushel. The Imperial Amber produces a large amount of straw which is somewhat weak, a bearded head with red chaff, and a red grain of average quality. The straw of the Tasmania Red, Geneva, Kentucky Giant, Turkey Red, Tuscan Island, and McPherson is comparatively weak, but the grain is hard and weighs well per measured bushel.

Thirty-one varieties of winter wheat, grown in 1910, have been under experiment for at least five years. In the five years' test, the highest yields of grain per acre of the named varieties have been produced by the Dawson's Golden Chaff (47.6 bushels) and three other varieties which resemble it very closely and which have yielded as follows: American Wonder, 51 bushels; American Banner, 50.8 bushels; and Abundance, 48.6 bushels. The highest yields produced by varieties of other types in the five years' experiment are as follows: Crimean Red, 44 bushels; Prosperity, 43.4 bushels; Kentucky Giant, 42.9 bushels; Genesee Reliable, 42.7 bushels; No. 5 Red, 42.6 bushels; Early Genesee Giant, 42.6 bushels; Turkey Red, 42.3 bushels; Egyptian Amber, 42.2 bushels; and Banatka, 42.1 bushels. The heaviest weights of grain per measured bushel in the five years' test have been produced by the Northwester, 63.7 lbs.; Geneva, 63.1 lbs.; Banatka, 63 lbs.; Rudy, 63 lbs.; Genesee Reliable, 63 lbs.; Egyptian Amber, 62.9 lbs.; Kentucky Giant, 62.9 lbs.; Crimean Red, 62.8 lbs.; Turkey Red, 62.7 lbs., and Imperial Amber, 62.7 lbs.

Of the forty-three named varieties of winter wheat grown in 1910, the greatest yields of grain per acre were produced by the Grand Prize, 53.6 bushels; Crimean Red, 53.2 bushels; Banatka, 52.4 bushels; New Perfection, 52.3 bushels; Kharkov, 52.1 bushels; Red Wave, 51.2 bushels; and Buda Pesth, 50.3 bushels; and the heaviest weights per measured bushel by the Rudy, 63.3 lbs.; Bulgarian, 63 lbs.; Nigger, 63 lbs.; Northwester, 62.9 lbs.; Farmers' Friend, 62.8 lbs.; Kentucky Giant, 62.6 lbs., and Michigan Amber, 62.5 lbs.

In each of the past three years, the varieties of winter wheat grown in the Experimental department were carefully tested for bread production in the Bakery branch of the Chemical department of the College. The varieties of winter wheat which produced the largest loaves of bread from equal quantities of flour in the average of the tests made in 1907, 1908 and 1909 are as follows: Crimean Red, Banatka, Tuscan Island, Buda Pesth, Scott, Yaroslaf, Kentucky Giant, Tasmania Red, Rudy, and Egyptian Amber. These all possess red grain and, with one exception, bearded heads; and with two exceptions, white chaff.

From the results of experiments conducted with different varieties of wheat at the College, it seems to be generally true that white wheats yield more grain per acre, possess stronger straw, weigh a little less per measured bushel, are slightly softer in the grain, produce a more popular pastry flour, and furnish a somewhat weaker flour for bread production than the red varieties.

New Strains and Hybrids of Winter Wheat.

During the last few years, a considerable amount of work has been done with the object of improving some of the best varieties of winter wheat by means of

systematic selection and by cross-fertilization. It is interesting to note that, during the last three years, the highest yields of all the winter wheat experiments, both in yield of grain per acre and of weight of grain per measured bushel, have been obtained from some of the new kinds originated at the College either by pure selection or by the aid of cross-fertilization. Some of the most interesting hybrids have been obtained by crossing the Dawson's Golden Chaff with the Tasmania Red, the Buda Pesth, the Turkey Red, the Bulgarian, and the Imperial Amber.

Varieties of Spring Wheat for Flour Production.

Although there is but little spring wheat grown in the western part of Ontario it is still the principal wheat grown in some of the eastern counties of the Province, as for instance, in 1910 no less than 28,787 acres of spring wheat and 500 acres of winter wheat were grown in Renfrew county, and 4,257 acres of spring wheat and 18 acres of winter wheat in Carleton county. Not only have we had under experiment the different varieties of spring wheat obtainable in Ontario, but we have imported other kinds from various countries of the world and have tested them under similar conditions with those which we have grown in this Province. The following table gives the average results for seven years of each of thirteen varieties of spring wheat grown at the College.

Varieties.	Bearded or Bald.	Color of Grain.	Average Height.	Per cent. of Rust.	Days to reach maturity.	Weight per measured bushel.	Yield per acre.	
							Straw.	Grain.
			Ins.			Lbs.	Tons.	Bus.
Minnesota No. 163.....	Ba.	Red	45	6	122	59.25	2.13	**35.54**
Red Fife.....	Ba.	Red	46	7	121	58.80	2.05	**34.33**
Climax.....	Be.	Red	46	6	120	59.85	2.11	**34.29**
Hungarian.....	Be.	Red	41	5	117	62.56	2.02	**33.74**
Saxonka.....	Be.	Red	46	5	120	60.35	1.97	**33.53**
Carleton.....	Be.	Red	47	7	121	60.06	2.09	**33.33**
Wellman Fife	Ba.	Red	45	9	121	58.41	2.05	**32.18**
White Russian.....	Ba.	Red	43	7	122	58.62	1.95	**31.98**
Pringle's Champion....	Be.	Red	46	7	120	59.19	2.04	**31.97**
Red Fern.....	Be.	Red	46	7	120	59.94	1.89	**31.02**
Herison Bearded	Be.	Red	43	6	120	62.24	1.86	**30.22**
Preston	Be.	Red	43	8	117	59.50	1.71	**30.12**
Colorado.....	Be.	Red	44	8	116	59.74	1.84	**28.45**

Not only is there a variation from 28.4 to 35.5 bushels in yield of grain per acre, but there is also a difference of 1.7 to 2.1 in tons of straw per acre, and from 58.4 to 62.2 in average weight of grain per measured bushel. The Minnesota No. 163, is a selection of the Red Fife variety made by Prof. W. M. Hays, now Assistant Secretary of Agriculture for the United States. Prof. Hays did some admirable work in seed selection with spring wheats when connected with the Minnesota Experiment Station some years ago. The value of his selections is shown from the fact that one of them now heads the list in yield of grain per acre among all varieties which we have grown at our College for a period of seven years. The Red Fife variety is now well known, not only in Ontario, but throughout the Western Provinces, as it is the most extensively grown wheat in the great areas of Manitoba, Saskatchewan and Alberta. According to reports, the Red Fife variety was introduced by Mr. David Fife, an Ontario farmer, who in 1842 received from a friend

of his in Scotland a small sample of wheat obtained from a cargo lot which had arrived from Dantzic on the Baltic Sea. This small lot was sown by Mr. Fife as a spring wheat, but evidently it was a winter wheat, as only one plant produced heads. These three heads, however, furnished seeds which were sown in the following year and gave good results. From that small start the Red Fife wheat has become one of the best known varieties on the American Continent. Besides being a comparatively good yielder, the wheat itself is usually of excellent quality. The Hungarian variety, which stands fourth on the list, was obtained by the Ontario Agricultural College from the Argentine Republic through the kindness of a student who was in attendance at the College a few years ago. It is one of the earliest varieties of the spring wheats reported in the foregoing table. The Hungarian is also a wheat of good quality. The Colorado variety, which comes at the bottom of the list, is a very early variety, a light yielder, and produces wheat which is apt to shell considerably in the field, and produces a comparatively poor quality of flour when ground.

Varieties of Macaroni Spring Wheats.

The Wild Goose variety of spring wheat has been grown in Ontario for many years and has proven to be one of the largest yielding varieties in the Province. People who grow it realize that it is a wheat considerably different from the ordinary varieties of spring wheat. They do not realize, however, that it belongs to a different species of spring wheat from that represented by the Red Fife, White Russian, etc. The Wild Goose is one of the varieties of what is known as the macaroni or the durum wheats. These wheats are grown quite extensively in some countries for the manufacture of macaroni. In Ontario, the Wild Goose variety has been quite extensively exported to southern Europe in years past for macaroni purposes. When shipped out in this way, the price is usually very good, being about equal to that of the flour wheats. When used for flour in this country, however, it generally brings a slightly lower price than the common wheats, owing principally to the difficulty in grinding the grain and to the yellow shade of the flour, especially of some of the varieties. The macaroni wheats, however, are usually high in protein and are being more and more used for the production of flour for mixing with some of the weaker varieties of fall wheat in order to furnish a blended flour superior to either one when used by itself. Some varieties of macaroni wheats have been grown at our College for a long period, and others for a shorter length of time. The following table gives the average results of five years' experiments with each of seven varieties of the macaroni wheats:

Varieties.	Average results for 5 years.				Average results for 5 years.		
	Bearded or Bald.	Average Height.	Per cent. of Rust.	Days to reach Maturity	Weight per measured bushel.	Yield of straw per acre.	Yield of grain per acre.
		ins.			lbs.	Tons.	Bus.
Wild Goose	Be	44	9	121	62.8	1.9	35.8
Triticum Durum	Be	45	9	120	63.1	1.8	33.9
Kubanka	Be	45	7	119	62.8	1.8	33.5
Sorentina	Be	46	9	117	60.6	1.9	31.6
Medeah	Be	45	5	116	61.2	1.7	31.4
Iumillo	Be	38	12	119	61.9	1.8	29.8

It will be seen that the Wild Goose variety occupies the highest place in average yield of grain per acre. The average yield of the Wild Goose per acre for five years, however, is only about one-quarter of a bushel per acre per annum greater than the yield of the Minnesota No. 163 in the average results for seven years as reported in the table of the flour wheats. If we comparke two varieties for a longer period of time, however, we find that the Wild Goose considerably surpasses the Red Fife variety, as can be seen by the examination of the table presented near the beginning of this report. The Wild Goose has not been giving quite as large a yield of grain per acre during the last year or two as it did previously. The Triticum Durum, which is mentioned second on the list, is simply a scientific name for the macaroni wheats. This particular strain was obtained some years ago through the Department of Agriculture at Washington. It is very similar indeed to the Wild Goose variety. The Iumillo variety is noted for its disease resistant qualities in some of the western states. It has, however, proven to be a comparatively light yielder in our experiments at Guelph.

Emmer and Spelt for the Production of Grain for Feeding Purposes.

Emmer and Spelt represent two species of spring wheat. Although both Emmer and Spelt have been grown at our College more or less for the last twenty years, the last named grain is scarcely ever grown in Ontario, but the Emmer has been used as a field crop in a number of sections. Each of these two types or species of grains contains a number of varieties. Both are used for grinding into meal for feed for farm stock, owing to the fact that the chaff adheres to the grain and is not removed in the process of threshing. The following table gives the average of nine years' results of each of three varieties of Emmer and three varieties of Spelt which have been grown at the College:

Classes of Crops.	Varieties.	Average results for 9 years.			Weight per measured bushel.	Average results for 9 years.	
		Per cent. Rust.	Per cent. of crop lodged.	Per cent. of hull.	Average of 8 years.	Straw per acre.	Grain per acre.
					lbs.	tons.	lbs.
Emmer	Common	3	35	21	39.7	2.1	3,023
	Russian	2	29	21	40.4	1.9	2.840
	Iowa	2	26	20	40.3	1.9	2,837
Spelt	Alstroum	16	4	30	28,8	1.7	2,268
	Red	12	4	29	28.6	1.7	2,248
	White	12	4	31	28.2	1.6	2,060

It requires only a short examination of the tabulated results here presented to show the marked differences between the different varieties of Emmer and the different varieties of Spelt when grown in Ontario. In every case, the Emmer is a heavy yielder of grain which is quite thin in the hull or the chaff, and possesses a straw which is rather weak but which is very free from rust. In comparison with these results, we find that in every instance the Spelt gives a comparatively low yield of grain, which is rather light in weight per measured bushel, and which has a large amount of hull. The straw is subject to the attacks of rust but usually stands well at the time of harvest. The great superiority of the Emmer over the Spelt as a grain producer is therefore clearly seen from these results. Not only

does this prove true in our experiments at the College, but it has also been quite manifest in the co-operative experiments throughout Ontario during the past few years. In practically all tests which have been made, the Emmer yields decidedly heavier than the Spelt. As Emmer has a short, compact head, it will frequently yield much more heavily than its appearance would indicate in the field. It has been found both at the College and throughout Ontario that Emmer forms a close rival of the leading varieties of barley and of the leading varieties of oats in the production of grain per acre by weight. From feeding experiments conducted at some of the agricultural experiment stations in the United States, Emmer has produced results not very different from those obtained from barley.

Other Types of Spring Wheat.

We have grown some wheats of other types than those on which we have already reported and have found that they have given comparatively poor results at the College. It seems necessary, however, to here give a careful comparison of some of these varieties in order to answer some of the sensational articles which have been written in many of the papers of the United States and in some of those in Canada regarding wonderful results obtained from some of these wheats, which are comparatively unknown by the farmers of our Province. Sensational advertisements and wide publicity was given through the public press in recent years of what was known locally as Corn Wheat in some of the western states. On examination, however, this was found to be what is known the world over as the Polish wheat (*Triticum polonicum*). More recently, the agricultural journals and the public press were greatly stirred over what was known as the Alaska wheat, and which evidently belonged to the species *Triticum turgidum*, and which appeared to be very similar to the Seven Headed Spring Wheat or the Miracle variety of winter wheat, both of which have been grown at the College. The following table gives the yields per acre of both the Polish and the Seven Headed varieties in comparison with the Red Fife and the Wild Goose varieties in each of fourteen years:

Year.	Red Fife (Triticum vulgare).	Wild Goose (Triticum durum).	Polish (Triticum polonicum).	Seven Headed (Triticum turgidum).
	Bus.	Bus.	Bus.	Bus.
1897	20.7	23.1	16.3	6.5
1898	34.2	48.3	27.1	24.7
1899	39.2	44.5	24.5	26.4
1900	46.3	48.4	34.5	39.4
1901	24.1	32.1	15.6	22.2
1902	31.9	33.5	29.1	25.0
1903	43.5	47.1	32.8	34.3
1904	22.2	47.1	20.1	33.2
1905	35.9	41.5	28.7	30.8
1906	33.9	36.0	19.5	28.2
1907	28.0	33.2	18.7	19.1
1908	36.3	25.6	23.8	24.5
1909	40.1	34.8	20.4	25.7
1910	44.0	49.2	30.6	37.5

In the foregoing table we have an excellent opportunity to compare, not only the Polish and the Seven Headed Wheats with our better known varieties, but

also in comparing the Red Fife and the Wild Goose varieties one with the other. The prices at which the Polish and the Alaska Wheats were sold were very high, and we would suggest that our farmers watch carefully the results of experiments before paying high prices for new varieties which are sensationally advertised and regarding which but little is actually known as to the results when grown as field crops in our Province. The Government of Ontario is doing much to protect the farmers by its extensive system of experimental work conducted at the Ontario Agricultural College and through the medium of the Experimental Union.

Varieties of Rye.

In 1910, nearly 100,000 acres of rye were grown in Ontario, and the average yield per acre was seventeen bushels. This area is about 20,000 acres less than the average acreage for rye in Ontario for the past twenty-nine years, but the yield per acre is nearly one bushel per acre more than the average for the same period. Both winter and spring varieties are grown in this Province, but the greatest area, especially in the western part of Ontario, is used for the winter rye.

Varieties of Winter Rye. Winter rye is a very hardy crop in Ontario. At the Agricultural College we have found it considerably more hardy than winter wheat. In 1910, four varieties of winter rye were grown in the Experimental Department for the seventh year. The average results for the whole period of seven years show the yield per acre per annum in bushels of grain and in tons of straw to be as follows: Mammoth White, 60.8; 3.8; Washington, 56.7; 3.6; Thousand Fold, 54.0; 4.0; and Common, 53.7; 3.9. It will be seen that the Mammoth White has given the largest average yield per acre of the four varieties under test. A detailed examination of the records show that not only was the Mammoth White variety the highest in average yield per acre, but it actually occupied the highest place in this respect in each of six out of seven years, and came second in yield per acre in the other year. In average weight of grain per measured bushel the lowest was the Common variety, with 56.7 pounds, and the highest was the Mammoth White with 57.5 pounds. In 1910, the highest yield was produced by the Mammoth White and the second highest by the Thousand Fold.

Varieties of Spring Rye. Three varieties of spring rye have been grown under similar conditions at the College in each of the past six years. The spring rye usually makes rather a shorter growth and gives a somewhat lighter yield of grain per acre than the winter ryes. It grows very rapidly, however, maturing early and being comparatively free from rust. The following table gives the average results for six years of each of the three varieties of spring rye.

Varieties.	Average results for 6 years.		
	Weight per measured bushel.	Straw per acre.	Grain per acre.
	Lbs.	Tons.	Bus.
Petkos	55.8	2.08	30.2
Prolific Spring	55.5	1.96	27.
Common	55.6	1.89	26.8

The Petkos variety of spring rye was obtained in Germany some years ago. This variety was reported in 1909 under the German name of Saatroggen. The

writer made a special trip of about seventy-five miles from Berlin, Germany, to visit the greatest rye breeder in that country. From a little seed obtained of a special rye which had been carefully bred for years, a start was obtained in securing a rye which has given exceptionally good results in Ontario. This variety at first gave exceptionally poor returns, as only comparatively few of the plants produced seed. After a short time, however, it improved and during the past six years it has given an average yield of 3.4 bushels per acre per annum more than the Common variety. It has also produced a heavier straw and a grain which weighed slightly more per measured bushel.

From careful selection, however, we now have a strain of the Petkos rye which we started from an individual plant, and which has surpassed the original Petkos variety in every year that it has been grown. The new selected strain of Petkos rye has given an average of 6.9 bushels per acre more than the Common six-rowed variety. This strain stands decidedly higher than any variety of spring rye which we have been able to secure in America.

Varieties of Buckwheat.

The growing of buckwheat is greatly increasing in Ontario. The area devoted to this crop during the last five years is 53 per cent. greater than that of the five years previous. This increase is probably due to several causes, such as the value of this variety as a smothering crop in the eradication of weeds, and the lateness to which the crop can be sown in the season and still give satisfactory returns. We have recently had one or two late seasons which prevented the farmers from sowing some of their crops at the proper seasons. As buckwheat could be sown satisfactorily at a later date than some of the other crops, it was used as a substitute. Its extent is not yet very great as in 1910 there were 194,913 acres used for this crop. The following table gives the average results of each of five varieties of buckwheat grown at the College for a period of six years:

Varieties.	Average results for 6 years.		
	Weight per measured bushel.	Straw per acre.	Grain per acre.
	Lbs.	Tons.	Bus.
Rye Buckwheat or rough	53.3	2.0	33.0
Common Grey	47.5	2.6	24.5
Silver Hull	51.9	2.6	22.6
Japanese	46.0	2.5	22.0
New Calcutta	50.8	2.7	20.5

The Rye Buckwheat stands at the head of the list in average yield of grain per acre. The results are very striking, showing that the Rye Buckwheat gave an average of 8½ bushels per acre more than the Common Grey, which was the next highest yielding variety. It is not only true that the Rye Buckwheat surpassed the Common Grey in average yield per acre, but it is also true that the former surpassed the latter variety in each of the past six years; in fact, the Rye Buckwheat has not been surpassed by any other variety in any single year except in 1910, when the Japanese gave four bushels per acre more than the Rye Buckwheat. The Japanese variety, however, is not very uniform in productiveness, as it gives heavy

crops in some years and exceedingly light ones in other years. The Rye Buckwheat is a very heavy producer of grain, but does not possess as heavy a straw as the other varieties which we have had under test. In weight of grain per measured bushel, however, the Rye Buckwheat has made the best record.

Varieties of Field Peas.

Field peas are an exceedingly valuable crop to grow in Ontario. It was very unfortunate indeed that the Pea Weevil (*Bruchus pisi*) did so much damage to the pea crop in Ontario a few years ago. This pest, however, appears to be much less troublesome than formerly, owing evidently to the fact that many farmers stopped growing peas entirely, which almost completely eradicated the weevil. We find that in 1909 there were 381,609 acres and in 1910, 403,414 acres of field peas grown in Ontario. If we multiply the average yield of field peas per acre in Ontario for the last twenty-nine years by an average percentage of digestible protein in peas, we find that there has been an annual production of 219 pounds of digestible protein per acre from the pea crop. This is about 103 pounds greater than that produced from barley, 108 pounds greater than that produced from oats, and more than double the amount of that produced from either winter wheat, spring wheat, buckwheat or rye. For a fuller comparison of these crops grown in Ontario, the reader is referred to the report containing an address given by the writer at the Provincial Winter Fair in December, 1910. For copies of this report, communications should be addressed to the Department of Agriculture, Toronto, Ont. In this address the values of Canadian field peas and six-rowed barley were clearly demonstrated.

In each of eleven years, eight varieties of field peas have been grown under similar conditions in the experimental plots at the College. The following table gives the average results of these experiments:

Varieties.	Days to mature. Average of 14 years.	Length of Vines. Average of 9 years.	Average results for 11 years.		
			Weight per measured bushel.	Straw per acre.	Grain per acre.
		Ins.	Lbs.	Tons.	Bus.
Early Britain	103	40	57.3	1.36	37.7
Potter	104	45	59.7	1.44	35.8
New Canadian Beauty	105	47	60.5	1.43	32.6
Black Eyed Marrowfat	106	42	59.7	1.42	31.7
White Eyed Marrowfat	105	42	60.8	1.53	31.4
Prussian Blue	108	46	59.8	1.55	28.2
Golden Vine	106	42	60.0	1.42	27.9
Multipliers	111	49	60.3	1.72	27.2

The Early Britain variety, which stands at the head of the list in average yield of grain per acre for the eleven years, is a brown pea which was imported from England by the Ontario Agricultural College and which has made a very excellent record in the co-operative experiments throughout Ontario as well as in the experimental plots at Guelph. Although the color is probably somewhat against this pea for market purposes, it has proven to be very serviceable in furnishing split peas of a rich color which is greatly liked especially by the owner of a split pea factory in Guelph, who drew the writer's attention to this fact and was very anxious to get this variety more extensively grown by the farmers. The Potter

variety is a white pea of good quality. The Golden Vine is the common small white pea of Ontario, and it will be observed from the report here presented that it has given an average of 9.8 bushels per acre per annum less than the Early Britain variety.

Twenty-seven varieties of peas have been under experiment in each of the past three years. A number of these varieties were obtained from Dr. Piper of the Bureau of Plant Industry of the Department of Agriculture at Washington. The following table gives the average results of each of these varieties for a period of three years:

Varieties.	Average results for 3 years.		
	Weight per measured bushel.	Yield of straw per acre.	Yield of grain per acre.
	Lbs.	Tons.	Bus.
Potter	59.5	1.42	37.2
Black Eyed Marrowfat	59.9	1.57	37.0
Early Britain	56.2	1.38	36.1
New Canadian Beauty	60.5	1.47	33.1
White Scimitar	56.7	1.20	31.7
No. 20,467 Washington (Sweden)	57.8	1.61	31.4
Clamart	57.6	1.20	31.3
White Marrowfat	61.2	1.56	29.9
Early Sippinaw	58.3	1.32	29.2
No. 12,887 Washington	59.0	1.65	25.7
New Zealand Field	56.2	1.02	24.9
No. 17,006 Washington	58.3	1.57	24.9
No. 20,466 Washington (Sweden)	60.5	1.02	23.8
No. 21,288 Washington (India)	53.7	1.04	23.5
Canner	57.3	1.05	23.5
Golden Vine	59.8	1.46	23.4
Swiss China	56.8	.68	23.4
Multipliers	59.8	1.47	22.0
Prussian Blue	58.9	1.40	20.8
Common Canada Field	59.8	1.64	20.0
Prince Albert	60.0	1.72	19.8
No. 20,465 Washington (Sweden)	58.1	1.02	18.7
No. 21,290 Washington (India)	57.5	1.31	18.7
No. 21,289 Washington (India)	51.7	.70	12.3
No. 12,888 Washington	56.5	.42	8.4
No. 21,605 Washington (India)	50.3	.38	7.8
No. 21,534 Washington (India)	51.6	.53	7.5

All the varieties received from the Department of Agriculture of the United States are so indicated in the tabulated results here presented. The country from which the seed was obtained by the United States is also indicated. Those varieties obtained from Sweden are from the noted Experiment Station at Svalof. It will be seen that those varieties which have given the best results over a long period of time are still leading varieties in the average results of the experiments extending over a period of three years. The four varieties which occupy the highest place in average yield of grain per acre of the eight different varieties for eleven years also occupy the highest yield per acre in the average results of the twenty-seven varieties grown for three years. The order, however, of these four varieties is not the same in the two tests.

Varieties of Field Beans.

While it is true that the bean crop is not an important one in many parts of the Province, it is nevertheless a fact that in Kent county no less than 26,362 acres of beans were grown in 1910. Next to this in area of beans was Elgin county, with 8,202 acres.

The following table gives the average yield of each of eight varieties of field beans grown at the College for a period of twelve years:

Varieties.	Average results for 12 years.	
	Weight per measured bushel.	Grain per acre.
	Lbs.	Bus.
Pearce's Improved Tree	64.80	25.1
Schofield Pea	64.96	23.1
White Wonder	64.69	22.4
Medium or Navy	64.74	22.3
Burlingame Medium	64.56	21.2
Marrowfat	64.29	21.1
Small White Field	64.17	18.9
Large White Haricots	58.79	17.8

It will be seen that there is an average difference of 7.3 bushels per acre per annum from the highest as compared with the lowest yielding varieties of beans. It will also be seen that the highest yielding varieties give a good weight per measured bushel, each variety producing grain which weighed upwards of 65½ pounds.

In the experiments of the past four years, three other varieties have been included in the test, viz.: The Red Kidney, the New Prize Winner, and the Yellow-Eyed Marrowfat. These three varieties have given an average yield per acre in the order in which the names are given. In comparison with the eight varieties already reported we find that these three newer varieties have been surpassed in average yield of grain per acre by the Pearce's Improved Tree, the Marrowfat, and the Scholfield Pea varieties.

Varieties of Soy Beans.

Soy beans or Japanese beans have been advertised in seed catalogues under the name of Soja beans. During recent years, a considerable interest has been taken in this crop in England, the United States, and in Canada. The crop furnishes exceedingly rich feed for farm stock, and the plants may be cut and converted into silage, or they may be allowed to ripen for the production of grain. Although there are a large number of varieties, the most of them require a long season to reach maturity and are quite unsuited for cultivation in Ontario. Probably thirty varieties in all have been under experiment at our College, but only a few of these ripen their seed. The two varieties which have become the most prominent in our experiments at Guelph are the Early Yellow and the Medium Green. The Early Yellow variety has proven to be one of the best for most parts of the Province as it yields very well and matures early. In the average results of growing the Early Yellow Soy Beans at the College in each of fifteen years we have obtained exactly 15 bushels of threshed seed per acre.

In 1909 and again in 1910, no less than sixteen varieties of Soy Beans were grown in the Experimental Department. A number of these were tested in 1909

for the first time, several of them being obtained from Dr. Piper, Department of Agriculture, Washington. The season of 1909 was quite unfavorable for the growth of the Soy Beans in Ontario, the heaviest yield per acre being produced by the Early Yellow variety, which was only a little over 13 bushels per acre. In 1910, however, the season was a little more favorable, and the greatest yields obtained were produced by the following varieties: Chernie, 23.5 bushels; Habara, 21.6 bushels; Buckshot, 21 bushels; Tsurunoko, 19.6 bushels; Akasaya, 17.5 bushels; and Early Yellow, 17.2 bushels. The other varieties all gave 15 or less bushels per acre. It might be mentioned, however, that a selected strain of the Early Yellow variety came second on the list, being surpassed only slightly by the Chernie variety. This selected strain gave an average yield of 22.3 bushels per acre.

Varieties of Flax Grown for Seed.

Flax is grown both as a fibre plant and for seed production in certain parts of Ontario. Its cultivation in this Province, however, is not very extensive except in a few localities. In the Western Provinces, flax is grown considerably on land which is plowed in the spring for the first time.

In each of six years, experiments have been conducted at the College in the growing of flax from seed which was originally obtained from Ontario, Manitoba, Holland, and Russia. For the five years previous to 1910, each of four varieties were sown by using six different quantities of seed per acre. In 1910, however, only two quantities of seed per acre were used. The average results of the six plots of each lot of flax for each year previous to 1910 and of the two plots in the past season are as follows:

Varieties.	Average results for 6 years.		
	Average weight per measured bushel.	Straw per acre.	Grain per acre.
	Lbs.	Tons.	Bus.
Manitoba	54.2	2.6	19.1
Common	54.0	2.6	17.7
Russian	54.4	2.4	16.3
Holland	54.2	2.3	15.0

The Manitoba flax has given comparatively the best results in yield of seed per acre. In weight of seed per measured bushel, it is only slightly surpassed by one variety, and in straw per acre it was equal to the Common variety, but it was a heavier producer than either of the other two.

In 1910, seven different lots of flax were grown in the Experimental Department. The one which gave the highest average yield of seed per acre was the Minnesota No. 25, which surpassed the Manitoba flax by nearly two bushels of seed per acre. The German Crown and the Argentine varieties of flax gave very poor results, being late in maturity and light in seed production. It is interesting to note that the Minnesota No. 25, which came the highest on the list in 1910, is a variety originated by a special selection made by Prof. W. M. Hays, who was connected with the Agricultural College at Minnesota some years ago.

Varieties of Millet Grown for Seed.

Millet is grown in Ontario for the production of green fodder, of hay, and also of seed. It can be sown later in the season than many of the other farm crops,

and it thus proves serviceable in filling in places which could not be sown with other crops at the proper time.

No less than twenty-seven different varieties and strains of millet were grown in the Experimental Department for seed production in 1910. The following table gives the average yield of seed per acre, and the average weight of seed per measured bushel of each variety in the experiments extending over a period of seven years:

Varieties.	Average results for 7 years.	
	Weight per measured bushel.	Grain per acre.
	lbs.	bus.
Siberian	54.0	53.8
Steel Trust	55.0	50.3
Hungarian	53.9	46.3
Holy Terror Gold Mine	51.3	43.5
German or Golden	53.6	39.2
Common	54,4	37.9
Golden Wonder	51.9	36.5

The Siberian variety of millet is certainly prolific in seed production, the average yield for the seven years being 53.8 bushels. In comparison with this, there is an average yield of only 36.5 bushels per acre from the Golden Wonder and 37.9 bushels per acre from the Common millet of Ontario. The Hungarian grass, which is considered by many as quite distinct from the millets, is classified by us and reported as a variety of millet. The Japanese Panicle and the Japanese Barnyard varieties of millet are both good producers of seed, but as these varieties ripen a little later than most other kinds, and as the small birds, especially the canaries, are exceedingly fond of the seed, it is a difficult matter to so protect the plots that an accurate determination of the seed production can be made.

In the results for 1910, the greatest yields per acre of the different varieties were produced as follows: Steel Trust, 63.8 bushels; Siberian, 62 bushels, and Kursk, 60.8 bushels.

As in the case of the grain crops, systematic seed selection has been carried on with the millets. Some very promising strains have been obtained by starting with individual plants. Decidedly the highest yield of seed per acre in 1907 and in 1909 was obtained from a selected strain of the Japanese variety of millet. In 1908, a selected strain came 4th, and in 1910, 2nd in yield of seed per acre. Taking into consideration the last four years, one of the strains of the Siberian millet occupies the highest place in seed production of all the different varieties and strains of millet under test.

Vetches for Seed Production.

Hairy Vetches have been considerably advertised for use as a farm crop during recent years. They have been very highly spoken of as a cover crop for orchards and have also been recommended for fodder production. The seed, however, is nearly all imported from across the Atlantic and is very expensive, costing usually about $5.00 per bushel, and for general purposes about one bushel of seed per acre is required. Last autumn, however, the writer had two or three letters

stating that seed was available at a much less cost. This, evidently, was Ontario grown seed and was being sold for about $3.00 per bushel. In each of the past nine years, the Hairy Vetches have been sown in the autumn and allowed to ripen in the following year in connection with our experimental work at the College. In the average results of nine years, we obtained 6.8 bushels of seed per acre per annum. The yield is very irregular. In 1910, we had 21.2 and in 1903, 18.2 bushels per acre. In 1908, however, the yield of seed was less than one bushel per acre and in four of the last nine years it has been less than four bushels per acre per annum. We find, however, that the seed which has been grown in Ontario for some time is superior to that which is freshly imported for growing a crop for seed production. In the crops of the last seven years, the seed which has been obtained in Ontario has given an average of fully 2½ bushels per acre per annum more than that which was freshly imported. All the results here referred to are from seed which has been sown in the autumn and the crop which has been produced in the year following. Other experiments have been conducted in the production of seed from spring sowing, but it is found that the yield per acre is very much less than that produced from the seed which is sown the latter part of August.

The Common Spring Vetches have also been used for seed production, but it is found that the results are very unsatisfactory. It is only in an occasional year that a satisfactory yield of seed of the Common Spring Vetches can be obtained at the College.

Winter Emmer.

The results from different varieties of spring Emmer were presented in an earlier part of this report. Although there are a few varieties of winter Emmer, only one kind has been under experiment at the College. In the spring of 1906 the writer was in the State of Kansas and saw a number of varieties of winter Emmer under experiment at the Agricultural College at Manhattan. One of these varieties was doing exceptionally well, and through the kindness of the Experiment Station a small quantity of the seed was obtained for experimental purposes. This has now been grown in our experimental plots at Guelph in each of the past four years, and the following yields in pounds of grain per acre per annum have been obtained: 1907, 3,050; 1908, 1,728; 1909, 1,388; and 1910, 3,809. This gives an average of 2,494 pounds of grain per acre. It will be seen by reference to the results on the spring varieties of Emmer that the Common variety gave a yield of 3,023 pounds of grain per acre per annum in the average of nine years experiments. Although the yield of the winter Emmer is very good, it will be seen from the reference here made that it is considerably lower than that produced by the spring variety.

Sunflowers for Seed Production.

Although sunflowers have not been considered as a regular farm crop by many people, yet there are those who advocate their use for seed production, for producing material for the silo, etc. Seven varieties of sunflowers were tested at the College for five years, after which all were discarded with the exception of three, which have now been under experiment in each of the past thirteen years. The following table gives the average results of the size of the heads for ten years, of the average height and yield of both heads and whole crop per acre for thirteen years, and the average yield of grain per acre for twelve years.

Varieties.	Diameter of 25 Heads. 10 years.	Average Height. 13 years.	Average yield per acre.		
			Heads 13 years.	Whole crop. 13 years.	Grain. 12 years.
	ins.	ins.	tons.	tons.	bus.
Mammoth Russian	7.29	100	5.97	18.05	74.7
White Beauty	7.38	87	5.60	16.18	74.4
Black Giant	7.08	107	6.32	22.36	72.0

Taking the standard weight for sunflower seed as being 20 pounds per measured bushel, it will be seen that we have obtained a yield in the average of twelve years of 74.7 bushels per acre from the Mammoth Russian variety. This is equivalent to an average of 1,494 pounds of seed per acre. It will therefore be seen that the sunflowers have given heavy yields of seed per acre at the College. They are a very hardy crop, and would likely be comparatively heavy yielders in different parts of the Province. For this experiment the seed was planted about the same as corn. Some farmers harvest the heads of the sunflowers and run them through the cutting box along with corn when filling the silo, considering that the silage is improved in quality thereby, owing to the fact that the sunflower heads contain a large amount of oil. The seed is frequently used as feed for poultry.

Varieties of Sorghum for Seed.

The term sorghum represents several groups of plants which are used more or less for fodder as well as for other purposes, and includes the different varieties of sugar cane, broom corn, kaffir corn, millo maize, etc. Of these different sorghums sixteen varieties were under test in 1910, some of them producing no ripened seed and the rest comparatively light yields. The largest amounts of seed produced per acre in 1910 were by the following varieties: Early Japanese broom corn, Australian broom corn, Cud Grass (China), Early Amber sugar cane, Improved Evergreen broom corn, California Golden broom corn, Shallu, Early Minnesota sugar cane, and Albaugh sugar cane.

Three varieties of sorghum have now been grown in the Experimental Department in each of eight years. It is found that the broom corns have been the heaviest producers, the average yield per acre of the different varieties for the eight years being as follows: Early Japanese broom corn, 25.2 bushels; Improved Evergreen broom corn, 23.7 bushels; and California Golden broom corn, 23.2 bushels. In determining these results, 48 pounds has been used as the standard weight per measured bushel.

Varieties of Corn for the Production of Shelled Grain.

Those counties of Ontario which contain the greatest area devoted to the growing of corn for husking were the following in 1910: Essex, 78,336 acres; Kent, 65,000 acres; Lambton, 24,975 acres; Elgin, 23,347 acres; Norfolk, 17,633 acres; Middlesex, 17,259 acres; Welland, 8,066 acres; Oxford, 8,015 acres; Prince Edward, 7,326 acres; and Lincoln, 6,968 acres. The total area devoted to the grow-

ing of corn for husking purposes in 1910 is 320,519 acres as compared with 326,627 acres of corn grown for the silo.

In 1910, there were ninety-eight different varieties and strains of corn under test at the College. A number of these, however, did not mature the grain and had to be judged entirely from a standpoint of fodder production. For the report on the different varieties of corn based on fodder production, the reader is referred to a later section of this report. Fourteen varieties of corn have been grown for grain production for the last five years in succession. The average results of the five-year period are here presented for each of these varieties:

Varieties.	Color of Grain.	Average Number of Rows per Ear.	Average Results for 5 Years.			
			Number of Days until in Full Tassel.	Height of Plants.	Weight of Freshly Cut Stalks, Leaves and Ears.	Shelled Grain per Acre.
				in.	tons.	bus.
Early California Flint	Yellow	12	83	93	11.23	66.7
Wisconsin Little Dent	Yellow	14	77	92	7.21	60.9
White Cap Yellow Dent	Yellow	14	82	101	10.49	60.0
University No. 13	Yellow	16	83	100	10.33	59.7
Longfellow	Yellow	8	82	96	12.62	56.4
Genesee Valley	Yellow	8	81	93	11.79	55.4
Red Blazed Yellow Flint	Red and Yellow	8	80	100	11.66	54.5
Wessel	Yellow	8	82	99	11.16	53.8
New Ideal	White	14	83	91	8.63	53.6
Compton's Early	Yellow	12	85	103	12.77	52.4
Earliest of All White Dent	White	12	74	75	5.55	51.0
Sterling White Dent	White	14	85	102	10.99	48.3
Canada Yellow	Yellow	8	86	94	12.59	46.4
Salzer's North Dakota	White	8	90	100	15.14	42.4

The tabulated results are not only interesting in giving the average yield of grain per acre, but they also furnish other information, particularly the yield of the freshly-cut material, less the weight of the husked ears, and therefore including the stalks, leaves and husks. It will be seen that the Early California Flint, which is a yellow, twelve-rowed variety of corn, has given the largest yield of grain per acre and stands 6th in the list in yield of freshly-cut stover, the average of the latter being 11.2 tons per acre. The White Cap Yellow Dent, although growing eight inches taller than the Early California Flint, has given slightly lower yields per acre. It should be noted that the White Cap Yellow Dent has single stalks, while the Early California Flint usually produces an abundance of suckers. This distinction holds good in practically all cases of the dents and the flints, the former being non-stoolers and the latter quite heavy stoolers. The Salzer's North Dakota, although the lowest on the list in grain production, gave the highest amount of fodder other than grain of the varieties included in this test.

Comparison of Strains Within the Varieties.

While it is true that there are marked differences in the different varieties of corn for grain production, it is also true that the differences between the strains of the same varieties are often quite large. In many cases, farmers located in different parts of the country have been growing corn for a number of years and have been

selecting the ears according to their own ideals, some with the object of producing heavy crops, others hoping to get earlier strains, etc. Owing to the different conditions of soil and selection, these various lots of corn of the same variety eventually become somewhat distinct in some of their characteristics. In order to glean information regarding the influence of these various selections on the variety itself, seed of the White Cap Yellow Dent corn was obtained from eight different farmers in the western part of Ontario. Owing to different causes, however, it has been impossible to secure seed regularly from all of these men each year. I am pleased to state, however, that we have been able, in three instances, to receive seed from the same source for five years in succession. The seed thus obtained has been planted under uniform conditions each season, and the crops have been carefully examined. The following table gives the average results of five years' experiments in testing the White Cap Yellow Dent corn obtained from three different sources; two from Essex county, and one from Middlesex county:

Varieties.	Results for 5 Years.			Yield of Grain per Acre. (Bushels by Weight.)					
	Number of Days until in full Tassel.	Height of Plants.	Weight of freshly cut Stalks, Leaves and Ears.	1906.	1907.	1908.	1909.	1910.	Average.
		in.	tons						
White Cap Yellow Dent (J. Hammond)	82	101	10.49	86.0	54.5	62.5	48.9	48.0	60.0
White Cap Yellow Dent (E. M. Zavitz).....	85	108	12.10	87.1	45.5	63.4	43.0	41.9	56.2
White Cap Yellow Dent (A. Dawson)	86	110	12.71	76.8	36.6	61.6	32.1	32.6	48.0

The results here presented form an interesting study. The corn obtained from Hammond in Essex county, gave the highest yield of grain per acre in three out of the five years, and that obtained from Dawson, also in Essex county, gave the lightest yield of grain in each year's experiment. It will be noticed, however, that Dawson's corn gave 2.23 tons of stover more than that obtained from Hammond's selection. Dawson's corn was the latest, the tallest, the heaviest in total crop and the lightest in yield of grain of the three. The corn obtained from Zavitz, in Middlesex county, yielded almost as much stover as that from Dawson, and at the same time fully eight bushels of shelled grain per acre more than that of the last named source. This corn produced an average of 2.6 tons of stover per acre more, and 3.8 bushels of threshed grain per acre less than that obtained from Hammond. From what has been stated, and from a study of the results here presented, it will be clearly seen that a variety of corn grown for some time by different men, who have probably been selecting their seed from somewhat different standpoints, will eventually produce grains which vary considerably. It is therefore important for farmers when securing seed from any one source which they find to be satisfactory, to be careful in the strain of seed which they secure if they find it necessary to change their source of supply.

We have just shown that a corn like the White Cap Yellow Dent variety, when grown in neighboring counties or even in the same county for a few years, may become changed considerably. When corn is grown under entirely different conditions for a number of years, the variations in the different strains of the same varieties might be considerably greater than was indicated by the results of the White Cap Yellow Dent corn previously referred to. In order to illustrate more clearly what I mean by this reference, I here draw the attention of the reader to the results of two lots of the Longfellow variety of corn obtained regularly from two different sources. The one lot we obtained from J. O. Duke, Ruthven, Ont., and the other from the Steele Briggs Seed Co., Toronto, Ont. It is quite probable that in each year the seed obtained from Duke was produced in Essex county, and that obtained from the Steele Briggs Seed Co. was imported from the United States. Whatever the source of supply, the results are certainly quite marked. The following table gives the results of these two lots of Longfellow corn for each of six years:

Varieties.	Average results for 6 years.			Yield of grain per acre. Bushels by weight.						
	No. of days until in full tassel.	Height of plants.	Weight of freshly cut stalks, leaves and ears.	1905	1906	1907	1908	1909	1910	Average 6 years.
		in.	tons.							
Longfellow (Duke)	82	97	12.62	71.9	84.9	51.8	61.2	36.9	47.3	59.0
Longfellow (Steele Briggs)..	87	97	13.78	52.0	79.0	33.9	55.8	27.4	34.5	47.1

It will be seen that although the corn grew to the same average height, the Longfellow variety obtained from the Steele Briggs Seed Co. was five days later in tasseling and produced 1.16 tons of stover per acre more than the Longfellow variety obtained from Duke. Again, it will be noticed that in every instance the Longfellow variety which was obtained from Essex county, gave a greater yield of shelled corn per acre than that obtained from the Longfellow corn obtained through the Toronto seed house. The average in yield of grain per acre for the six-year period was practically 12 bushels per acre per annum in favor of the Longfellow corn obtained from Essex county. These results, as well as those presented previously, show the great importance of the farmers having some knowledge, not only of the varieties of corn, but also of the source under which the seed has been grown.

Varieties of Potatoes.

The number of acres devoted to the growing of potatoes in Ontario fluctuates somewhat from year to year. In 1905, there were 132,530 acres; in 1907, 177,186 acres; and in 1910, 168,454 acres. A slightly decreased acreage in 1910 is probably due, to a considerable extent, to the low price at which potatoes sold in Ontario in 1909. The average yield of potatoes per acre for Ontario for the last twenty-nine years has been 116 bushels, while that for 1910 was 130, and that for 1909, 145.

There are far too many varieties of potatoes grown in Ontario at the present time. If a few of the very best varieties were selected and grown more extensively, I believe that the yields per acre would be increased and the prices obtained would be higher. In many localities it is practically impossible to secure large quantities of potatoes which are uniform in shape and color and which could be satisfac-

torily placed together for shipping purposes. From inquiries made throughout Ontario, the following appear to be some of the most extensively grown varieties in the Province at the present time: Rural New Yorker No. 2, Empire State, Carman No. 1, and Beauty of Hebron. Following these, but grown to a considerably less extent, are the Delaware, White Elephant, and Early Ohio. The Rural New Yorker, No. 2, a white, round potato, and the Empire State, a white, oval potato, appear to be the most extensively grown varieties in the Province at the present time.

One hundred and two varieties of potatoes were grown in the experimental grounds at the College in 1910. Of this number, sixty-two varieties have been grown in each of the past five years. In the average results of the five years' test, the Davies' Warrior heads the list with 267.7 bushels per acre. This variety of potatoes was obtained soon after its introduction in Scotland, from which country a small quantity of seed was secured. It is a large, white potato, comparatively shallow in the eyes and rather late in reaching maturity. It somewhat resembles in appearance the Carman No. 1 variety. The table quality of the Davies' Warrior is good, taking into consideration its flavor, mealiness, and appearance. Other leading varieties of potatoes in experiments at the College are as follows: Empire State, American Wonder, and Rural New Yorker No. 2 of the late varieties; Burpee's Extra Early and Rose of the North of the medium ripening varieties; and the Early Eureka, Early Puritan, and Early Fortune of the early varieties. Of these, particular attention is drawn to the Empire State as being a variety of potatoes which does exceptionally well in many localities throughout Ontario. It is a white potato, oval in form, good for market purposes, high in yield, low in percentage of small potatoes, and good in table quality. The Empire State is a finer grained potato than the Rural New Yorker No. 2. When the last named variety is grown on sharp, warm soil, the quality is usually good, but when grown on rich, loamy land, the potatoes are apt to be large, coarse, and frequently hollow. The Early Eureka is also a white potato, and has proven to be one of the very best both in yield and in table quality of the very early varieties. I wish to again call attention to the importance of the farmers in confining their energies more particularly to the careful selection and the successful growing of a few of the very best varieties instead of dividing their attention over such a great number of different kinds, some of which are of poor quality, sell at comparatively low prices, and frequently give poor results. It would be much better, especially in those localities where potatoes are grown somewhat extensively, if the farmers would confine themselves to a few choice varieties so that the buyers could secure large quantities which would be uniform in type and color.

Potatoes Obtained from Different Sources.

An interesting experiment was conducted in 1910 in testing seed potatoes obtained from different sources. Seed of the Empire State variety, for instance, was obtained from Muskoka and from two sources in New Brunswick. These three lots of potatoes were compared with seed of the Empire State variety which had been grown at the College without a change of seed from any outside source for twenty-one years. This experiment in 1910 was conducted in duplicate. While the detailed results are not presented, owing to the fact that the test has been conducted only one year, it might be stated that in both tests the Empire State potatoes which had been grown in the College plots for twenty-one years produced a higher yield of potatoes per acre than the seed obtained from any of the other sources used in each of the two tests. Seed obtained from New Brunswick of the Delaware, the

Irish Cobbler, and the Green Mountain variety was also tested with the seed of the same variety grown at the College, and these varieties were tested in duplicate. None of these varieties were grown at the College for as long a period as the Empire State. In every instance, however, the seed which was grown at the College in 1909 gave higher yields than that obtained from any other source. In considering the results here presented, it might be well to refer back to an earlier part of the report and to read what is there stated under the following heading: "Thirty-five varieties of farm crops grown continuously at the College from sixteen to twenty-two years."

Bordeaux Mixture for the Potato Blight.

In each of the past four years, early, medium, and late potatoes have been sprayed in different ways with two different solutions of the Bordeaux mixture. In reference to these two solutions, the following quotations are made from the College Bulletin No. 154:

"The first thing to do in the manufacture of the Bordeaux mixture is to decide on some recommended formula. The formula which has long been advocated in Ontario is known as the 4—4—40 formula. It is as follows:

$CuSO_4$ (crystallized copper sulphate)	4 pounds.
CaO (quicklime)	4 "
Water	40 gallons.

"With good lime it only needs about one pound to act on all the copper; the excess given, three pounds, covers all danger which might arise from the use of a poor article. A large excess of lime is a disadvantage; it causes the Bordeaux mixture to exert a slow fungicidal action, it is apt to cause the machinery to clog and to cause an uneven application, and the particles of lime, offering more resistance to rain, will cause the mixture to be more rapidly washed from the trees. It may be an advantage, however, in a very wet season, by causing the Bordeaux to retain its efficiency longer and by allowing less injury to be done to foliage. Orchardists are inclined to use a less proportion of lime, and the following formula is recommended:

$CuSO_4$ (crystallized copper sulphate)	6 pounds.
CaO (quicklime)	4 "
Water	40 gallons.

"As both copper sulphate and lime dissolve and slake, respectively, much quicker in hot water than cold, it is better to use heated water in order to save time. The very best lime obtainable is used, and if freshly burned, all the better. In slaking, do not use an excess of water, but just enough to keep the lime moist. When the action is completed, enough water is added to make a thin whitewash, and then the whole is strained through coarse sacking to remove any lumps which would clog the nozzle of the spray pump. This done, enough water is added to make the volume up to one-half of what the final mixture will amount to. The copper sulphate solution is diluted to the same extent. The two are now mixed, the operation being best performed by two men, each with a bucket, one handling the lime and the other the copper sulphate. They are poured into the spray tank, two bucketsful at a time, until the whole is brought together. In this way a precipitate is obtained which will remain in suspension with only occasional agitation. If mixing is done before dilution, a very coarse precipitate is formed, which settles rapidly to the bottom of the spray tank and requires almost constant stirring.

"If large quantities of spray mixture are going to be used, it is an excellent plan to make up "stock" solutions of the copper and lime. This can be done by dissolving, say, one pound of copper sulphate in each gallon of water and making up a barrel full of it. Each gallon of the solution taken then represents one pound of the bluestone. The salt can be conveniently dissolved by filling the barrel with water and then suspending it therein, enclosed in a canvas sack. The lime can be handled in the same way, being sure, of course, that the contents of the barrel are thoroughly stirred up before dipping out any portion. Keep the barrels covered when not in use.

"Before Bordeaux mixture is sprayed, it is absolutely necessary that all copper should be in the form of the sky-blue precipitate, i.e., enough lime must be used to act

on all the bluestone. Formulæ advocated by the experiment stations always contain enough lime to precipitate all the copper, but it may sometimes happen that such a very poor quality is used that there will be some of the sulphate left unchanged. There are several simple ways by which one can tell when enough lime is present. Those who are very familiar with the reaction which occurs can tell by the color of the precipitate, it having a greenish tinge when an insufficiency of lime is present, instead of the deep, sky-blue color. However, those who are not familiar with the process must use more decided tests. Three simple ones can be employed as follows:

"1. Take some of the clear solution which is left on top when the sediment settles, and place in a white saucer. Add a few drops of a solution of potassium ferrocyanide to it. If a reddish-brown precipitate or coloration appears, more lime is needed.

"2. Take a portion of the clear fluid as before, and blow the breath gently over the surface. If a thin white pellicle or covering forms over the top, enough lime has been added.

"3. Take a bright piece of steel, such as a knife blade, and hold it in the mixture for a minute or more. If it becomes coated with copper, more lime is required.

"Test number one is the most reliable and is the one recommended.

"In handling copper solutions use only wooden, brass or copper vessels; all other receptacles would be corroded and destroyed by them; besides, the fungicide itself would be injured.

"Copper compounds are poisonous and therefore should not be left lying around where children and animals can get at them."

In the experiments of the past four years, one plot of each variety of potatoes was left unsprayed, one plot was sprayed on top of the vines 2 times, one 3 times, one 4 times, and one 5 times. Another plot was sprayed 3 times both on top and underneath the vines. In the results for 1910, the lowest yield was obtained from the unsprayed potatoes. The amount of rotten potatoes from the six unsprayed plots was about equal to the amount of rotten potatoes from the thirty sprayed plots. It will therefore be seen that, on the average, the unsprayed plots would have about five times as many rotten potatoes as the same area of land which produced potatoes which were sprayed. In the average results for the four years, the greatest yield of potatoes was obtained from an application of five sprayings of the Bordeaux mixture. Potatoes which were sprayed three times both on top and underneath the vines also gave very good results. It is a difficult process, however, to spray in this manner with the present appliances.

Other Potato Experiments.

Several other experiments with potatoes, such as the treatment for the scab, the treatment for the potato beetles, different dates of planting, the use of commercial fertilizers, etc., were conducted in 1910. The results of these experiments, however, can be reported along with the results of similar tests in a future publication.

Root Culture in Ontario.

While it is true that the cultivation of corn in Ontario is gradually increasing, it is also true that the cultivation of the root crops still occupies an important place in Ontario's agriculture. A few years ago, turnips were the principal root crop in many sections of the Province and the mangel crop occupied a much smaller area. During recent years, however, the acreage of the turnip crop in Ontario has been decreasing, while that of mangels has been somewhat on the increase. In 1900, there were 156,583 acres of turnips and 54,543 acres of mangels. In 1910, however, there were only 108,360 acres of the former, while there were 68,966 acres of the latter. Besides the mangels and the turnips, sugar beets and carrots were also grown as farm crops to a limited extent in the Province.

Nearly all the seed of field roots which is used in Ontario is grown in Europe. During the last four years, we have carried on systematic work in the production of seed of mangels, swede turnips, and carrots, and have been testing the seed so produced with seed of similar varieties which has been imported. In the autumn of each of the past five years, roots were selected and stored during the winter and were replanted in the spring. Some of each class of roots were pitted in the fall, some were stored in piles in the root cellar, and some were placed in sand. We have, however, found it difficult to pit a small quantity of roots and have the roots under the same conditions as those which have been pitted in large quantities. In the other methods of storing, we found we could obtain practically as good results when the roots were stored in the loose piles in a cool cellar as when they were packed in sand. During the past two years we have obtained some very good results from the home grown root seed.

Varieties of Mangels.

In 1910, forty-nine different lots of mangels were sown in the Experimental department. Of this number, four were different lots of the Yellow Leviathan, the seed of which was grown at the College, and seven were different lots obtained under the name of Yellow Leviathan from seven Ontario seedsmen who advertise this variety in their seed catalogues. The others were varieties obtained from various seedsmen in Ontario, United States, and from some of the most noted producers of mangel seed of Europe. The first seeding took place early in May. Of each variety three rows one chain in length were used. As the rows were 3⅓ links apart, there was exactly 1-100th of an acre in each of the plots. The seed was planted with great care by placing exactly four clusters of seed every 10 inches in the row. There would therefore be 948 mangel clusters, usually called seeds, planted in each plot. At a little later date, a duplicate test was made by planting in exactly the same way one row of each variety, each row being 4 rods in length. These two different sets gave a good opportunity for studying the germination of the mangel seeds under field conditions. This experiment was conducted in a very similar way in 1909, except that there were four instead of two tests made with the different varieties. As the germination of nearly all of the European seed was so poor in 1909, no results could be furnished regarding the comparative yields of the different varieties in that year. The germination of the seed in 1910 was rather better, on the whole, than that of 1909 except in individual cases. The results here presented, therefore, give the average percentage of germination for the two years, which included six separate tests:

Varieties.	Shape.	Percentage of germination aver. 2 yrs. 1909–1910 (6 tests).
Yellow Leviathan (O. A. C.)	Intermediate	116
Giant Eckendorf (Vaughan)	Tankard	113
Steiger's Yellow Leutewitzer	Intermediate	112
Von Arnim's Criewener	Tankard	111
Bruce's Gate Post Mammoth Long Red	Long	106
Garton's Improved Yellow Globe	Globe	102
Carter's Red Emperor	Intermediate	100
Yellow Leviathan (Ferry)	Intermediate	93
Crimson Champion (Rennie)	Intermediate	92
Keith's Prize Taker	Globe	92

Varieties.	Shape.	Percentage of germination aver. 2 yrs. 1909–1910 (6 tests)
Yellow Leviathan (Steele, Briggs)	Intermediate	91
Evan's Improved Mammoth Sawlog	Long	89
Kirsche's Ideal	Tankard	87
Carter's Windsor Prize Taker Yellow Globe	Globe	86
Yellow Leviathan (Hewer)	Intermediate	85
Simmers' Mammoth Prize Long Red	Long	82
Steele, Briggs' Prize Mammoth Long Red	Long	82
Sutton's Mammoth Long Red	Long	79
Mammoth Red Intermediate (Bruce)	Oval	77
Bruce's Giant Yellow Intermediate	Intermediate	72
Rennie's Perfection Mammoth Long Red	Long	71
Sutton's Prize Winner Yellow Globe	Globe	69
Steele, Briggs' Giant Yellow Intermediate	Intermediate	64
Yellow Leviathan (Rennie)	Intermediate	63
Yellow Globe Selected (Steele, Briggs)	Globe	16

The Yellow Leviathan mangel, having given the highest results in the average of several years' experiments of the different varieties of mangels tested both at the College and throughout Ontario, has been given a prominent place in these experiments. It is now advertised in the catalogues of seven Ontario seedsmen, and seed of this variety was obtained from these seven distinct sources in the spring of 1910 and was tested in the experimental plots. Besides these, the home grown seed of the same variety was brought under competition with the rest.

It will be seen from the foregoing results that the Yellow Leviathan seed produced at the College had the highest average percentage of germination. This, however, was followed quite closely by two or three European varieties. It will also be noticed that there is a difference in the germination of the Yellow Leviathan variety obtained from different seedsmen. That obtained from D. M. Ferry and from Steele, Briggs gave over 90 per cent., while that obtained from the Wm. Rennie Co. gave an average of 63 per cent. The seed of the last named sort was lowest in germination of the different lots of Yellow Leviathan both in 1909 and in 1910. Seed under the name of Yellow Leviathan was also obtained from Geo. Keith, Toronto, J. A. Simmers, Toronto, and Jno. A. Bruce, Hamilton, in the spring of 1910. The mangels produced, however, from the seed obtained from J. A. Simmers and from Jno. A. Bruce were of a different type than that of the Yellow Leviathan. As we have only one year's test of the seed obtained from Geo. Keith, the results of the germination are not presented in the foregoing table.

Varieties of Sugar Beets.

Sugar beets are grown quite extensively in the vicinity of Berlin and of Wallaceburg for sugar production. Besides these, however, sugar beets are also grown considerably throughout Ontario as a crop for feeding to farm animals. Those varieties of sugar beets grown for sugar production are usually rather smaller in size and grow almost entirely under the ground, while those which are grown as a farm crop are larger in size and are much easier handled, as they grow out of the ground somewhat similar to mangels. Those varieties of sugar beets which have been bred extensively for sugar production usually give about 15 per cent. of sugar when grown in this country, while those which are raised more particularly as a stock feed will contain, on an average, only about 10 per cent. of sugar.

Twenty-two varieties of sugar beets were grown at the College in 1910. All the varieties were grown in rows twenty-one inches apart and the roots were thinned to seven inches apart in the rows. The following table gives the average results in tons of roots per acre, and also the percentage of sugar as determined in the Chemical department at the College:

Varieties.	Length.		Per-centage Sugar.	Yield per acre. 6 years.
	Above Ground.	Below Ground.		
	in.	in.		tons.
Bruce's Giant White Feeding	4.00	4.72	8.1	26.8
Rennie's Tankard Cream	3.38	4.61	*8.6	23.6
Steele, Briggs' Royal Giant	3.11	5.16	10.2	22.5
Simmers' Imperial Giant Half Sugar	3.07	5.33	†10.6	22.4
Bruce's Giant Rose Feeding	3.23	5.22	13.0	21.8
Rennie's Giant Sugar	3.12	5.24	†10.3	21.4
Rennie's Danish Improved	3.03	5.31	11.1	21.2
White Silesian	.91	6.19	13.7	18.6
Red Top	1.36	6.02	11.2	18.2
Champion	.84	6.46	15.7	17.6
Improved Imperial	.69	5.79	16.8	16.4

*Average for 4 years. †Average for 3 years.

It will be seen from the foregoing results that there is a marked variation both in the yield per acre and the quality of the sugar beets. The highest yielding variety is the lowest in sugar, and the lowest yielding variety is the highest in sugar. Of all the varieties grown in 1910, the greatest yields per acre were produced by the Steele, Briggs Giant White, 30.8; the Rennie's Jumbo, 30.4; the Giant Half Sugar White, 30.3; the Keith's Prize Winning Half Sugar, 30; and the Bruce's Giant White Feeding, 29.7 tons.

Varieties of Swede Turnips.

The results from the experiments with swede turnips in 1907 and in 1908 were so poor that the comparison of the different varieties was practically useless. The results for the other five out of the past seven years, however, were satisfactory. The following table gives the average results for the five years: 1904, 1905, 1906, 1909, and 1910, in weight per root, yield of tops per acre, and yield of roots per acre:

Varieties.	Average of 5 years' results.		
	Weight per foot.	Yield of tops per acre.	Yield of roots per acre.
	Lbs.	Tons.	Tons.
Carter's Invicta	2.00	8.30	22.52
Carter's Prize Winner	1.95	8.07	22.41
Sutton's Queen	1.94	5.28	22.18
Improved Purple Top Yellow	1.85	8.32	21.65
Rennie's Empress	1.94	7.57	21.60
New Century	1.87	7.13	21.39
Improved Hall's Westbury	1.84	8.06	21.38
Sutton's New Bronze Top	1.93	7.37	21.14
Simmers' Defiance	1.79	7.81	20.87

Varieties.	Average of 5 years' results.		
	Weight per root.	Yield of tops per acre.	Yield of roots per acre.
	Lbs.	Tons.	Tons.
Rennie's Improved Elephant	1.83	7.71	20.87
Sutton's Champion	1.84	6.61	20.71
Rennie's Prize Purple Top	1.82	6.77	20.65
Simmers' Universal Purple Top	1.80	7.11	20.52
Carter's Imperial Hardy Swede	1.80	8.20	20.32
Sutton's Magnum Bonum	1.73	7.67	19.36
Buckbee's Giant	1.76	8.67	19.18
Sutton's Crimson King	1.69	8.16	18.62
Hartley's Bronze Top	1.64	7.24	18.61
Carter's Kangaroo	1.63	7.76	18.45
Carter's Queen of the Swedes	1.63	9.59	17.41

It will be seen that the varieties of turnips do not vary as greatly as do the varieties of some other classes of farm crops. Of the twenty varieties of turnips here reported, fourteen of them gave on the average from 20.3 to 22.5 tons of roots per acre. It is interesting to note that the two varieties which head the list and the two varieties at the bottom of the list in yield per acre are all from the same English firm. The Carter's Invicta is not only a large yielder per acre, but it has been pronounced by men who are engaged in the shipping of turnips for table use to some of the Eastern cities, such as New York, Philadelphia, and Boston, to be an excellent variety for that purpose.

Varieties of Fall Turnips.

Fall turnips also go under the names of soft turnips or white turnips. They are not extensively grown in Ontario. The yields are usually quite high, but the roots do not keep very long into the winter and are quite inferior to the swede turnips in this respect. Six varieties of fall turnips were grown in the plots in 1910. The greatest yields were produced by the following varieties: Red Top White Globe, 33.7 tons; Sutton's Imperial Green Globe, 26 tons; and Cow Horn, 25.1 tons per acre.

Three varieties of fall turnips have now been grown in the experimental grounds in each of nine years, the following being the average in yield of roots per acre per annum: Red Top White Globe, 26.6 tons; Early American Red or Purple Top, 20.2 tons; and Cow Horn, 19.7 tons.

Varieties of Field Carrots.

The area devoted to the growing of carrots in Ontario has decreased from 12,418 acres in 1898 to 3,551 acres in 1910. Eight varieties of field carrots have been grown under test at the College in each of the past five years and the results are presented in the following table:

Varieties.	Color.	Length of roots.	Yield per acre.
		Ins.	Tons.
Steele's Improved Short White	White	8.6	28.4
Mastadon White Intermediate	"	8.7	27.9
Simmers' Improved Giant Short White	"	8.7	27.4
Bruce's Mammoth Intermediate Smooth White	"	8.2	26.8
Carter's Hundred Ton	"	8.3	26.6
Large White Belgian	"	11.0	23.1
Rubicon Half Long Red	Red	5.9	21.7
Carter's Gate Post Orange Long	Yellow	9.0	21.6

It will be seen by comparing this table with the two foregoing ones that the carrots have actually given a little larger yield of roots per acre than either the swede turnips or the sugar beets. The Steele's Improved Short White variety heads the list with an average of 28.4 tons of roots per acre. These are roots of good shape and very different from the Large White Belgian which used to be grown quite extensively, but which gave an average yield of fully five tons per acre less than the Steele's Improved Short White variety. The Large White Belgian variety has long, slender, irregular roots which require much labor in harvesting.

Kohl Rabi.

The class of roots, known as Kohl Rabi, resembles cabbage in its root and swede turnips in its leaf growth. The valuable part grows about three inches above ground in the form of a bulb. The Kohl Rabi, when used for domestic purposes, is prepared much the same way as swede turnips. When grown as a food for stock, it is harvested and stored somewhat similar to mangels and turnips, although the crop is occasionally pastured off in the field. The Kohl Rabi is grown only to a limited extent in Ontario. Three varieties were tested in the Experimental department in 1910, the greatest yield being produced by the Earliest Erfurt, which gave 15 tons of roots per acre. Three varieties have now been grown under test at the College in each of nine years, and the average results of roots per acre are as follows: Earliest Erfurt, 18.2 tons; Early White Vienna, 17.9 tons; and Goliath Purple, 15.2 tons.

Varieties of Parsnips.

Parsnips are not usually considered a farm crop, and yet some discussion has been carried on in regard to the value of parsnips in the production of feed for farm stock. In order to obtain some information on the growing of parsnips with the object of feeding the same to farm stock, experiments with a few varieties have been conducted at the College during recent years. The most of these have now been dropped and only two varieties were included in the tests for 1910. The New Ideal Hollow Crown gave 19 and the Sutton's Cattle 20.5 tons per acre in 1910. As these two varieties have been grown in each of the past ten years, the average results should be of greater value than those for the past year. In the ten years' test, an average yield per acre per annum of 11.2 tons was obtained from the New Ideal Hollow Crown, and of 11 tons from the Sutton's Cattle.

Varieties of Fodder Corn.

One of the most important farm crops in Ontario at the present time is the fodder corn. This crop gives large yields per acre and can be used in the green condition, can be dried and fed in the winter, or can be cured in the silo. Although the acreage devoted to the growing of corn in Ontario for husking purposes is not changing to any great extent, we find that that used for the production of fooder corn is increasing considerably On an examination of the reports of the Bureau of Industries for Ontario, we find that for the five years 1906 to 1910, as compared with the five years from 1901 to 1905, there was an increase in the area of corn in Ontario of 24 per cent. There is only one other crop in the Province which has been increased more than the fodder corn during this period. The average yield of fodder corn per acre throughout Ontario in 1910 was 11.6 tons, and that for the average of the past nineteen years 11.46 tons. It will therefore be seen that the corn for fodder in the last year was slightly better than an average crop.

The fodder corns are largely grown in those counties of Ontario in which dairying is developed to a large extent, although many of the other counties are now devoting a considerable amount of attention to the fodder corn. Those counties which had the greatest amount of fodder corn in 1910 were as follows: Oxford, 24,709 acres; Middlesex, 17,783 acres; Carleton, 13,834 acres; Perth, 12,634 acres; Huron, 12,474 acres; Hastings, 12,018 acres; and York, 11,584 acres.

No one variety of corn is the best for all parts of Ontario. It is of the greatest importance, however, to secure those varieties which are particularly suited in the localities in which they are to be grown. In order to ascertain this information, it is important for each farmer to do a certain amount of experimental work for himself. Before doing so, however, he will find very great assistance from results of experiments which we have conducted at the College with a large number of varieties, where not only the total yield per acre but also the yield of ears, the stage of maturity, etc., are taken into consideration. The variety of experiments conducted at the College should serve as a general guide to the farmers in most parts of Ontario, indicating to them the kinds which are likely to be suitable for their respective localities. The requirements of the various localities are so different that it seems necessary to give the results of a large number of varieties which can be studied by individual farmers in order that the greatest value from the experiments can be obtained. We are therefore presenting the average of five years' experiments of each of fifty-two varieties of corn which have been grown under uniform conditions. The varieties in the list are arranged according to the total yield of green corn per acre. For these experiments, the corn was usually planted during the last ten days of May, and it was harvested about the middle of September. Immediately after the crop was cut, the ears were harvested. weighed, counted, and examined. The stage of the maturity of the corn was indicated by the condition of the grain at the time it was harvested. The seven terms which were used to describe the ripening of the corn at the time of husking were as follows: water, early milk, milk, late milk, dough, firm dough, and ripe. In each of the five years the experiment was conducted in duplicate, and we therefore have ten distinct experiments conducted with all of these varieties within the five year period. The average results of the five years' experiments are given in the following table:

VARIETIES OF CORN

Varieties.	Description of Varieties.		Average results of five years' experiments, 1906-10.					
	Class of Corn and Color of Grain.	Average number of rows per ear. 5 years.	Condition of grain when harvested.	Number of days until in full tassel.	Height of plants.	Weight per ear.	Yield per acre.	
							Husked ears.	Total crop green.
					inches.	ounces.	tons.	tons.
1. Eureka	Yellow Dent	16-18	Early Milk	106	126	8.08	3.16	25.52
2. Mogul	White Dent	18	Early Milk	105	122	6.73	3.18	22.83
3. 100-Day Bristol	Yellow Dent	14	Milk	100	120	7.16	3.26	22.47
4. Landreth's Large White Flint	White Flint	12¾	Early Milk	104	121	5.87	2.62	21.13
5. Dark County Mammoth	Yellow Dent	18¼	Milk	97	120	8.89	3.83	20.75
6. Pride of Indiana	White Dent	16-18	Early Milk	105	121	5.79	2.35	20.63
7. Mastadon Dent	Yellow Dent	18	Milk	98	117	8.69	3.71	20.46
8. Monitor	Yellow Dent	14-16	Milk	96	116	7.43	3.56	19.90
9. Cloud's Early Yellow	Yellow Dent	18-20	Milk	100	119	7.99	3.23	19.77
10. Reid's Yellow Dent	Yellow Dent	18	Milk	98	116	7.67	3.33	19.76
11. Marblehead Mammoth	Sweet	12-14	Milk	95	92	7.83	3.76	19.40
12. Salzer's North Dakota	White Flint	8	Dough	90	100	6.89	3.88	19.02
13. Burpee's White Evergreen	Sweet	16	Milk	97	94	7.89	3.65	18.90
14. Pharaoh's Dream	Sweet	12-14	Milk	94	96	6.62	4.09	18.83
15. Indian White Flour	Flour	8	Dough	87	100	8.12	4.08	18.70
16. Hoopengardner's Very Early Yellow Dent	Yellow Dent	16	Late Milk	89	109	10.12	4.89	18.66
17. Early Klondike	Yellow Dent	16	Milk	96	118	7.33	3.57	18.61
18. Early Butler	Yellow Dent	14-18	Milk	92	115	8.05	3.93	18.32
19. Smith's White Cap Yellow Dent (Duke)	Yellow Dent	14-16	Dough	88	110	9.36	4.44	18.32
20. Mayfield Earliest	White Dent	14-16	Late Milk	92	107	9.07	4.01	18.11
21. Improved Leaming	Yellow Dent	16-20	Milk	94	114	8.68	3.82	18.01
22. Mammoth Southern Sweet	White Dent	14-16	Early Milk	100	112	6.74	2.79	17.94
23. Stowell's Evergreen	Sweet	14-16	Milk	97	94	6.84	3.00	17.88
24. Mammoth Cuban	Yellow Dent	16	Milk	92	113	7.81	3.63	17.81
25. Howe's Yellow Dent	Yellow Dent	16-18	Late Milk	88	109	9.41	4.47	17.77
26. King Phillip (Duke)	Coloured Flint	8	Firm Dough	85	101	7.31	3.72	17.40
27. Compton's Early (Duke)	Yellow Flint	12	Firm Dough	85	103	9.15	4.58	17.35
28. Longfellow	Yellow Flint	8	Firm Dough	86	96	6.33	3.41	17.19
29. White Cap Yellow Dent (Dawson)	Yellow Dent	14	Late Milk	86	110	9.12	4.35	17.06
30. Bailey (Duke)	Yellow Dent	14-16	Late Milk	88	106	8.81	4.24	16.79
31. Compton's Early	Yellow Flint	12	Firm Dough	85	99	8.44	4.02	16.58

32. White Cap Yellow Dent (E. M. Zavitz)	Yellow Dent	14	Dough	85	108	9.39	4.36	16.46
33. Country Gentleman	Sweet	.....	Milk	95	91	5.42	3.24	16.33
34. Canada Yellow	Yellow Flint	8	Firm Dough	86	94	6.55	3.40	15.99
35. Weigle's Leaming (Duke)	Yellow Dent	14-18	Dough	86	106	9.27	4.26	15.94
36. Red Blazed Yellow Flint (Duke)	Coloured Flint	8	Ripe	80	100	8.16	4.01	15.67
37. Voorhees' Sweet	Sweet	12	Milk	94	83	5.70	3.58	15.61
38. Leaming (Duke)	Yellow Dent	16-18	Late Milk	89	109	9.30	3.94	15.59
39. White Cap Yellow Dent (Thomas)	Yellow Dent	12-14	Late Milk	84	103	8.52	4.09	15.58
40. Sterling White Dent	White Dent	14	Dough	85	102	9.23	4.28	15.27
41. Wessel	Yellow Flint	8	Ripe	82	99	7.10	3.56	14.72
42. University No. 13	Yellow Dent	16	Firm Dough	83	100	8.49	4.31	14.64
43. White Cap Yellow Dent (Hammond)	Yellow Dent	14	Firm Dough	82	101	8.34	4.03	14.52
44. Melrose	Sweet	12	Late Milk	87	82	7.70	4.23	14.52
45. Red Blazed	Coloured Flint	8	Ripe	82	96	7.30	3.59	14.43
46. Howling Mob	Sweet	12-14	Late Milk	81	78	8.62	4.54	13.28
47. New Ideal	White Dent	14	Firm Dough	83	91	8.82	4.30	12.93
48. Mammoth White Cory	Sweet	8	Dough	79	72	5.89	3.54	12.09
49. Wisconsin Little Dent	Yellow Dent	14	Ripe	77	92	8.07	3.90	11.11
50. Golden Bantam	Sweet	8	Dough	78	62	4.11	2.91	9.42
51. Earliest of All	White Dent	12	Ripe	74	75	6.69	3.08	8.64
52. Malakhoff	Sweet	10	Firm Dough	72	56	2.70	2.59	8.09

It does not take a very thorough examination of the table here presented to show that there is a marked difference in different varieties of fodder or silo corn. In stage of maturity, the varieties vary from early milk to being fully ripe. As a rule, the larger the variety the longer the season required for its growth. There are, however, many exceptions to this general rule. The Salzer's North Dakota, which gives an average of 19 tons per acre, is considerably earlier than the Mammoth Southern Sweet, which gives an average of 17.9 tons per acre. When the silo was in its early development in Ontario, many people grew the Mammoth Southern Sweet corn, but as this is such a late maturing variety the results were frequently quite unsatisfactory. Rather than to grow a large late variety, it is better to grow a corn which will not only give a large yield per acre but will also produce a good yield of ears and will reach a good stage of maturity in the locality where it is grown, before there is much danger of frost.

In the spring of each year, the Ontario Agricultural and Experimental Union distributes through Ontario seed for three experiments with corn; one with fodder corn, one with varieties of corn for husking, and one for sweet corn for table use. Usually three varieties are distributed for each of these experiments which enables the farmers to ascertain for themselves which of the most promising varieties in the experiments conducted at Guelph will produce the most satisfactory results on their individual farms.

It will be seen that several different lots of White Cap Yellow Dent corn are included in the test. These have been selected by different individuals for a number of years, and no doubt, as the result of different selections in different localities, we observe variations in several characteristics. The number of rows per ear has been somewhat changed, as the strain obtained from Thomas has an average of from twelve to fourteen rows, while that of J. O. Duke has an average of sixteen rows per ear. The Smith's White Cap Yellow Dent gave an average of 18.3 tons and that from Hammond 14.5 tons per acre. It will be noticed, however, that the grain of the latter was in the firm dough and that of the former was in the dough condition at the time of harvest. The corn obtained from Thomas is later than the Smith's White Cap Yellow Dent. when grown under similar conditions, and yet it yields 2.7 tons per acre less. It will, therefore, be seen that in growing corn for the silo or for dry fodder, it is important not only to secure the best varieties, but also to endeavour to secure the best strains of the best varieties.

Varieties of Sorghum for Fodder.

A number of crops are included under the term sorghum; such as sugar cane, broom corn, millo maize, kaffir corn, and Jerusalem corn. These are nearly all used more or less for fodder production, and some of them are used for other purposes, such as the sugar cane for the production of syrup, the broom corn for the production of material for the manufacture of brooms and whisks, the Jerusalem corn for the production of grain which is used very extensively as a human food in some of the Eastern countries.

The sorghums are grown quite extensively in some of the states of the American Union. They thrive well in a comparatively hot, dry climate where the corn makes a slow growth. At the College, none of the varieties have been used for silage and only one variety, the Early Amber Sugar Cane, has been used extensively for pasture. For the production of fodder, however, sixteen varieties were under experiment in 1910. Of this number, nine varieties have been grown under similar condtions in the Experimental Department in each of twelve years. The

seed was planted each year about the same as corn, except a little closer together. Three plants were allowed to remain in each hill and the hills were about twenty-seven inches apart each way. The sorghum received level cultivation throughout the season, as required. The following gives the average results of each of nine varieties, not only for 1910 but also for each of the twelve years during which this experiment has been under way:

Varieties.	Height.		Yield of heads per acre.		Total yield per acre.	
	1910.	Average 12 years, 1899–10.	1910.	Average 12 years, 1899–10.	1910.	Average 12 years, 1899–10.
	Ins.	Ins.	Tons.	Tons.	Tons.	Tons.
Orange Sugar Cane	83	91	.2	.3	18.7	18.6
Early Minnesota Sugar Cane	109	104	.3	.8	11.3	17.1
Early Amber Sugar Cane	87	94	1.3	1.0	13.7	16.0
Kaffir Corn	54	63	.1	.5	6.5	12.0
California Golden Broom Corn	103	109	.9	1.5	7.8	11.2
Early Japanese Broom Corn	96	105	1.1	1.5	7.8	9.6
Improved Evergreen Broom Corn	84	106	.9	1.3	5.0	9.4
Yellow Millo Maize	61	68	.2	.6	2.5	8.7
Jerusalem Corn	55	62	.1	.6	.3	5.8

As sorghums are tested at the College for both seed and fodder production, the reader is referred to an earlier part of the report for the results on the yields of seed. While the broom corns took the lead in seed production, it will be seen that the sugar canes come at the top of the list in the production of fodder, giving decidedly greater yields of green crop per acre than the broom corns. The Early Amber Sugar Cane, which is probably the best known in Ontario, has not given quite as large a yield as two other varieties. It will be seen, however, that it is a good yielder of heads, giving nearly three times the yield of the Orange Sugar Cane. This is owing partly to the fact that the Early Amber is earlier in maturing than the Orange Sugar Cane, which requires a pretty long season for development. The Millo Maize and the Jerusalem Corn are light yielders. It is well for the reader to keep these comparative results where he can refer to them in future. We sometimes read sensational articles regarding the great value of Kaffir Corn or some of the other classes or varieties of sorghum which require a much longer season of growth than that furnished in Ontario. The Early Amber Sugar Cane, however, has been giving very good results indeed in some parts of our Province. In Middlesex, it is grown considerably as a fodder corn and is increasing in popularity from year to year. Where a few years ago it was confined to only one farmer, it can now be seen each autumn on many farms. When in Middlesex county last autumn, it was my privilege to see a field of some seven acres of Early Amber Sugar Cane which was cut and shocked up. From making weighings in several parts of the field, the owner told me that the yield was about 22 tons of green crop per acre.

Varieties of Millet for Green Fodder and for Hay.

Millet is grown extensively in Siberia, India, Japan, and China, where the seed is used largely as human food. It is estimated that the seed of millet in one form or another is used as a portion of the food of fully one-third of the inhabitants of the world. In Ontario, millet is used for the production of green

fodder or of hay rather more than for seed. Some farmers grow millet more or less extensively as a regular crop, but as a rule it is sown to supplement some other crop, which, for some cause or other, has proven a partial failure. It is found that in some seasons the amount of rainfall is so abundant during the latter part of May or the early part of June that it is impossible to get corn planted in good condition, in which case the land can frequently be used to good advantage in growing millet, as it does not require to be sown until comparatively later in the season. In this way, the loss of the corn crop would not be felt so seriously as it would have been had not a fodder crop been secured from the land. It will therefore be readily seen that the millet crop is frequently an important one for the farmers of Ontario, as it can be used very readily when other coarse fodder is apt to be deficient.

Twenty different varieties and different strains of millet were grown at the College in 1910. Of this number, nine have been grown for at least five years in succession. The following table gives the results for 1910 and for the average of five years in height, yield of green crop, and yield of hay per acre:

Varieties.	Height.		Yield per acre.			
			Green fodder.		Hay.	
	1910.	Average 5 years. 1906–10.	1910.	Average 5 years 1906–10.	1910.	Average 5 years. 1906–10.
	ins.	ins.	tons	tons	tons	tons
Japanese Panicle	38	41	11.6	9.7	5.5	4.3
Holy Terror Gold Mine	35	33	9.1	8.6	4.0	3.7
Golden Wonder	31	34	7.8	8.4	3.4	3.5
Steel Trust	34	33	9.4	8.3	4.1	3.5
Hungarian Grass	36	33	8.4	7.7	3.9	3.3
Siberian	31	33	7.9	7.8	4.0	3.2
Japanese Barnyard	46	38	14.3	7.7	6.3	3.1
German or Golden	34	32	8.1	7.0	3.4	2.8
Common	33	32	7.7	6.8	3.3	2.8

The yield of millet per acre in 1910 was, on the whole, slightly larger than that for the average of the past five years. Particularly was that true of the Japanese Barnyard variety. This variety is greatly influenced by the conditions of the weather. In some seasons it gives high yields per acre, and in other seasons the yields are comparatively low. The Japanese Panicle variety occupies the highest place in average yield per acre for the past five years. Not only is this true for the past five years, but it also occupies the highest place in yield per acre of those varieties of millet which have been grown for the longest period of time, reaching now about twelve years. Not only does it give the highest yield of green fodder per acre, but it also produced the highest average yield of hay per acre in the five-year period. It will be noticed that the Japanese Panicle has given an average of exactly one ton of hay per acre more than the Hungarian Grass. The Japanese Panicle millet grows to a good height, stands up remarkably well, has a good leaf development, and is relished by farm stock. It is a little later in maturing than some of the other varieties. In the greater part of the settled portions of the Province, it is proving to be a most valuable variety, but it is not quite as suitable for the Northern districts as some of the other kinds. There has evidently been

a great misunderstanding amongst the seedsmen as to the different varieties of Japanese millet, as some of them in advertising the Japanese millet have illustrated the Japanese Panicle variety and have described the Japanese Barnyard Grass. This is the case of some of our leading seedsmen in their very latest as well as in several of their past catalogues. These two varieties are very different. The Japanese Panicle millet, the one which has given the best results at the College, has a dark reddish brown, shiny seed, which is quite different in appearance from that of the Japanese Barnyard Grass. In ordering millet from the seedsmen, it is wise not only to give the full distinct name of the millet, but also to secure a sample, and if the sample is of good quality and of the desired variety, the bulk of the seed can be ordered according to sample.

Sowing Millet at Different Dates.

In each of five years, an experiment has been conducted with the object of gleaning information regarding the best time to sow millet seed for the production of green fodder and of hay. Three characteristic varieties have been used for this experiment; viz., the Japanese Panicle, the Japanese Barnyard Grass, and the Hungarian Grass. The seeding took place near the first of May in each of the years, with the exception of 1909, and the succeeding seedings every half month until in all seven seedings were made, except in 1909, when only six seedings were used. As it is difficult to make hay out of the crop produced from the late seedings, especially in the case of the Japanese Panicle variety, the results have been worked up for the green crop. The following table gives the average yield of green crop per acre per annum for the last five years of each of the varieties from six different dates of seeding, and also for the average of the three varieties:

Dates of Seeding.	Average yield of Green Crop per acre.			
	Japanese Panicle.	Japanese Barnyard.	Hungarian Grass.	Average 3 varieties.
	tons.	tons.	tons.	tons.
May 15th.....	9.04	7.26	7.77	8.02
June 1st.....	10.02	8.69	8.32	9.01
June 16th	9.76	7.74	8.07	8.52
July 1st.....	7.60	7.30	8.04	7.65
July 15th.....	7.44	6.02	7.30	6.92
August 1st	—	—	3.52	—

According to the results of this experiment, there is a possibility of sowing any one of the three varieties of millets used in this experiment at too early a date to obtain the best results. Even the 15th of May does not give as high a yield of green fodder per acre as the seeding of the 1st of June. The last named date has given the best results, not only on the average, but also in the case of the individual varieties. After that date, there has been a decrease in productiveness of each of the different kinds. The 1st of June, therefore, appears to be a very favorable time for the sowing of millets in order to obtain high yields of fodder.

Varieties of Sunflowers for Fodder.

In an earlier part of this report, the results on sunflower for seed production were presented. As discussions have been carried on in past years in regard to the use of sunflower heads for mixing with corn in the silo, experiments have been

conducted at the College with the object of ascertaining the yield of sunflower heads per acre and the comparative value of the different varieties of sunflowers for this purpose. Seven varieties were grown in the Experimental Department for several years in succession, and three of these have now been grown for fifteen years. The three varieties which have been grown for fifteen years have given average yields in tons per acre of heads and of whole crop as follows: Black Giant, 6.1 and 20.4; Mammoth Russian, 5.6 and 16.5; and White Beauty, 5.6 and 16.2. The results of the White Beauty, however, are for thirteen instead of fifteen years. The stalks of the sunflowers become quite hard and of a woody character, but the heads are pliable and are in a much better condition for running through a cutting box and mixing with the corn for placing in the silo. Although the use of the sunflower heads has been recommended for this purpose, I doubt if the practice will come in use to any great extent.

Varieties of Rape, Cabbage, Kale, Etc., as Farm Crops.

Rape is fairly well known in Ontario, as it has been used in cultivation by some farmers for many years past. The rape plant resembles the swede turnip in its leaf, and the cabbage in its root. It is therefore the leaf and the stem which form a valuable portion for feed purposes. Rape makes an excellent late summer and autumn pasture crop for fattening cattle, sheep, and lambs, for which purpose it has been used at the College quite extensively in years past. One season, over six hundred lambs were pastured on rape on the College farm. There are quite a number of crops which can be handled in much the same way as rape for feeding in the autumn either as a pasture or a green fodder crop. It is therefore interesting to make a careful study of the different kinds of rape, kale, cow cabbage, mustard, etc., in order to understand the comparative results of these crops when grown in Ontario under our own conditions. Some of these crops are grown quite extensively in Great Britain. There were in all twenty-six distinct varieties belonging to this class under experiment at the college in 1910. The crops were all sown in rows 3 1/3 links (26 2-5 inches) apart. Each plot was exactly 1-100 of an acre in size, consisting of three rows each four rods in length. The seed was sown at the rate of about two pounds per acre and the plants of each variety were thinned to two inches apart in the rows. In general practice, however, it would be wise to sow about one and one-half pounds of seed per acre and omit the thinning. The land between the rows was cultivated occasionally throughout the early part of the growing season. The seeding in each of the past two years took place on June 21st, which is about a week later than the usual time of sowing. When the crops had reached their best condition for feeding, each variety was cut with the scythe and weighed immediately.

In England, the cabbage seed is frequently sown in the garden or in hot beds and the young plants are transplanted in the field at sufficient distances apart, and produce large heads. This, however, requires a great amount of labor, which is an important item in connection with agriculture in Ontario at the present time. In this experiment, the different varieties of cabbage have been treated in exactly the same way as the different varieties of rape and kale. The heads of the cabbage, therefore, have been quite small, the growth being principally leaf and stem. The feeding quality of these crops, however, appears to be very good. Another experiment was conducted in 1910 by thinning the cabbage plants at different distances in the rows. As this experiment was started a little later in the season, however, than the other, the germination of the seed was unsatisfactory and no valuable results can be presented for the test of thinning the plants at different distances apart for the past year.

The following table gives the results of rape and similar crops for 1910 and for the average of the past six years:

Varieties.	Height.		Green fodder, per acre.	
	1910.	Average 6 years 1905–10.	1910.	Average 6 years 1905–10.
	Ins.	Ins.	Tons.	Tons.
Sutton's Earliest Drumhead Cabbage	20	18	25.2	27.3
Thousand Headed Kale	32	35	21.3	25.4
Sutton's Giant Drumhead Cabbage	21	21	21.2	25.2
Sutton's Earliest Sheepfold Cabbage	19	18	21.8	24.1
Large Seeded Umbrella Rape	32	28	25.7	22.7
Sutton's Best of All Savoy Cabbage	19	18	20.5	22.1
Large Seeded Common Rape	30	30	20.4	21.8
Dwarf Victoria Rape	25	29	19.6	21.5
Marrow Collards	28	24	19.2	21.5
Buckbee's Wonderful Dwarf Bonanza Rape	32	30	23.8	21.4
Dwarf Essex Rape	24	29	20.1	21.2
Large Seeded White Flowering Rape	29	30	22.3	20.8
Purple Sprouting Boroccoli	30	31	19.0	20.5
Hardy Curled Kale	28	28	20.0	20.4
Jersey Kale	34	33	19.5	20.2
Cabbage Leafed Rape	32	32	16.9	19.6
Brussels Sprouts	25	25	16.0	16.3
New Chinese Mustard	50	60	12.8	14.8
Bloomsdale Large Leafed Mustard	50	58	12.4	14.5
White Mustard	46	55	12.4	13.5
German Rape	11	17	9.6	5.9

The yield per acre from this class of crops is large, in fact, it is even greater than those of the different varieties of fodder corn. The Sutton's Earliest Drumhead cabbage occupies the highest place in average yield of total crop per acre for the six years, producing 27.3 tons of green crop per acre per annum. This variety was slightly surpassed by the Large Seeded Umbrella rape in 1910, and in the average of the six years, the former surpassed the latter by 4.6 tons of green crop per acre per annum. The Dwarf Essex rape, which is the best known crop in Ontario of those mentioned in this class, occupies eleventh place in yield per acre and produces an average of six tons per acre less than the Sutton's Earliest Drumhead cabbage. The Thousand Headed kale has made a very good showing in crop production, and this is closely followed by two other varieties of cabbage obtained from England.

Besides the varieties reported in the table for six years, we have been testing three other varieties for a shorter period of time. Two of these have been under test for three years and during those three years have given an average yield as follows: Simmer's Matchless Flat Dutch cabbage, 25.6 tons, and Simmer's Early German Brunswick cabbage, 24.9 tons per acre. The seed of these two varieties, however, is considerably more expensive than that of the Sutton's Earliest Drumhead cabbage, which stands at the head of the list in average yield per acre for five years. The World Beater cabbage, which we have had under experiment for the past four years, has given slightly better results than the last two varieties here mentioned.

Various Leguminous Crops for Green Fodder.

In 1910, twenty-one different varieties of soy beans, cow peas, vetches, grass peas, etc., were grown for the production of fodder. Many of the varieties belonging to the classes of these fodder crops require such a long period for growth that they do not prove satisfactory for cultivation in Ontario. There are some, however, that usually reach sufficient maturity for fodder purposes and a few generally produce ripened seed. The greatest yields in tons per acre in 1910 were produced by the following varieties: Shingto soy beans, 12.3 tons; Cloud soy beans, 12 tons; Habara soy beans, 10.6 tons; Chernie soy beans, 9.5 tons; Hairy vetches, 9 tons; Tsurunoko soy beans, 8.8 tons; Buckshot soy beans, 8.5 tons; Akasaya soy beans, 7.3 tons; and Early Yellow soy beans, 7 tons per acre. Four varieties have been grown in each of the past ten years in succession for the production of green fodder. The average yields per acre per annum of these four varieties for the ten years are as follows: Hairy vetches, 7.4 tons; Grass peas, 7.2 tons; Early Yellow soy beans, 6.9 tons; Wonderful cow peas, 5.2 tons. The Ito San soy beans, which have been grown for six years, have given a higher yield of crop per acre than either of the four varieties just referred to, when the comparisons are made including only the past five years.

Alfalfa or Lucerne.

Alfalfa occupies an exceedingly important place in the agriculture of many of the Central and Western States of the American Union. It is also being cultivated much more extensively in the eastern part of America recently than it was in former years.

The area devoted to the growing of Alfalfa in Ontario has been increasing rapidly during the past few years. While it is true that a few farmers in different parts of Ontario have been growing Alfalfa successfully for ten, fifteen, twenty or even thirty or more years, the crop has not been brought into very general cultivation until quite recently. As the proper methods of growing Alfalfa become better known, its successful cultivation is rapidly increasing. Within the next few years the area devoted to this crop in the Province of Ontario is almost sure to be extended considerably. Its large yields of nutritious feed for farm stock, its perennial character of growth, and its beneficial influence on the soil are all features which commend it very highly for those farms on which it can be grown successfully. The following method of cultivation is copied from Bulletin No. 165, which gives the results of experiments in Alfalfa growing at the College and which can be obtained by an application to the Department of Agriculture, Toronto.

For the best results select land having a clean, mellow, fertile surface soil over-lying a deeply drained, sweet sub-soil. Use large, plump seed, free from impurities and strong in germinating power. Inoculate the seed with the proper kind of bacteria, providing Alfalfa has not been grown successfully on the land in recent years. In early spring make a suitable seed bed and immediately sow about twenty pounds of Alfalfa seed per acre from the grass seed box placed in front of the grain drill, and about one bushel of barley or spring wheat per acre from the tubes of the drill. Smooth the land with a light harrow. Harvest the grain as early and as quickly as its ripeness and its dryness will permit. Do not cut or pasture the Alfalfa in the autumn. If for hay cut each crop of Alfalfa in the following year as soon as it starts to bloom. Try to retain as many of the leaves on the stems as possible and to protect the crop from rain. Never cut or pasture Alfalfa sufficiently

close to the ground to remove the crowns of the roots and thus injure or possibly kill the plants. If these directions are followed, the Alfalfa may be expected to produce large and valuable crops for a number of years without re-seeding.

In each of the past two years experiments have been conducted in sowing Alfalfa on Winter Wheat at different dates and under different conditions in the spring. In these two years very good results have been obtained from sowing the Alfalfa either on the old snow just before it left the land or on a light fresh snow which occurred later in the season. The germinating seed and the young plants appear to possess sufficient hardiness to stand a considerable amount of frost. In one experiment this summer where the winter wheat grew very heavy and became badly lodged, the Alfalfa was completely killed out. From what we have been able to observe during the last two years it would appear that Alfalfa can be successfully sown on winter wheat very early in the spring and satisfactory results obtained providing the wheat would not grow too thick and rank during the summer so as to smother out the young Alfalfa plants.

Alfalfa sown about the first of September has given very poor results indeed, but that which has been sown about the middle of July on land which is moist and in good condition has given very satisfactory results. When sown at that time of course no other crop should be sown with the Alfalfa.

Alfalfa, when once well established, will, if desired, give three cuttings per year as a general rule in Ontario. The following table gives the yields per acre of the different cuttings of both green fodder and hay per acre of Alfalfa as produced by the Experimental department at the College in each of thirteen years.

Years.	Green Crop.					Hay.				
	First Cutting	Second Cutting	Third Cutting	Fourth Cutting	Total	First Cutting	Second Cutting	Third Cutting	Fourth Cutting	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1896	9.96	6.47	4.06	2.06	22.55	3.08	1.91	1.29	.65	6.93
1897	12.04	5.61	4.43	.....	22.08	3.59	1.56	1.23	.....	6.38
1898	9.71	5.85	2.64	.....	18.20	2.30	1.75	.63	.....	4.68
1900	11.93	6.00	1.60	.....	19.53	2.33	1.47	.80	.....	4.60
1901	9.70	2.20	7.49	.....	19.39	2.03	1.00	1.50	.....	4.53
1902	13.35	8.69	2.96	.....	25.00	2.50	2.02	.54	.....	5.06
1903	13.10	8.53	2.75	.....	24.38	2.50	2.09	.67	.....	5.25
1904	12.45	9.35	4.00	.....	25.80	3.40	2.50	1.08	.....	6.98
1906	9.78	6.60	4.85	.....	21.23	2.55	1.13	.58	.....	4.26
1907	14.55	3.95	.....	.....	18.50	2.95	1.05	.....	.....	4.00
1908	9.70	6.75	3.73	.....	20.18	2.50	1.15	.75	.....	4.40
1909	8.68	4.56	.84	.....	14.08	2.52	1.40	.14	.....	4.06
1910	15.08	3.88	4.76	.....	23.72	2.94	.80	1.32	.....	5.06
Average 13 years	11.54	6.03	3.39	.16	21.13	2.71	1.53	.81	.05	5.09

The tabulated results here presented are those of experiments which took place in different parts of the Experimental grounds, mostly in comparative tests with different varieties of clover. In each case the seed was sown in the spring of the year at the rate of eighteen or twenty pounds per acre and usually with a grain crop such as barley, sown at the rate of one bushel per acre. In each of eleven years the Alfalfa gave exactly three cuttings, but in 1907 it produced only two, while in 1906 it gave four cuttings in the one season. It will be remembered, however, that the spring of 1896 opened up very early and that of 1907 exceptionally

late. The average results for thirteen years show the annual yield of Alfalfa to be 21.1 tons of green crop and 5.1 tons of hay per acre.

Different Varieties or Strains of Alfalfa.

The different varieties or strains of Alfalfa are named largely according to the country in which the Alfalfa has been grown for a considerable length of time; such as, the Turkestan Alfalfa. Others have been named after the man who has been growing the crop continuously for some period; such as, the Grimm Alfalfa of Minnesota. While it is true that there are a few distinct species of Alfalfa, some of these are very rare and are practically unknown in this country. All the varieties under general cultivation in Canada belong to the one type or species. Wishing to obtain fuller information regarding the best sources of purchasing Alfalfa seed of the best quality for use in Ontario, we secured for experimental purposes samples of seed grown in different parts of the world. Some of these were obtained through the kindness and co-operation of the Department of Agriculture at Washington and some were obtained direct by the College from the producers of the Alfalfa. In the spring of 1905, twenty-eight plots were sown with Alfalfa seed obtained from different sources. From each of the plots three cuttings for hay were made in 1906, one cutting for hay and one for seed in 1907, and three cuttings for hay in each of the past three years. The following table gives the average dates of the first appearance of bloom for three years and the average yield per acre of the green crop and of hay for the four years 1906, 1908, 1909, and 1910:

Source of Seed.	Dates of First Bloom Average of 3 years.	Average yield per acre. The cuttings in each of the years 1906, 1908, 1909 and 1910.	
		Green Crop	Hay
	June	Tons	Tons
Texas, Panhandle	17	17.5	4.6
Nebraska	15	16.9	4.3
Turkestan, Khiva	18	16.5	4.1
Turkestan, Samarkand	19	16.2	4.0
Nebraska	21	14.9	4.0
New York	14	15.6	3.9
Chinese Empire, Sairam	19	15.3	3.8
Russia, Simbirsk	16	15.2	3.8
Northern Montana	15	14.3	3.6
Utah, irrigated	18	13.0	3.4
France, Poitou	15	13.8	3.4
Northern Montana	17	12.6	3.3
Ontario, O.A.C. seed, 1904	17	13.4	3.3
Texas, Sherman	15	12.4	3.2
Southern Montana	18	11.9	3.2
Germany	13	12.1	3.0
Colorado	19	11.9	3.0
Ontario, O.A.C. seed, 1903	18	11.4	3.0
Russia, Kharkoff	14	11.1	2.8
Kansas	21	10.0	2.7
Utah	16	10.0	2.7
United States, first quality commercial seed	14	11.4	2.7
Turkestan, through Wm. Rennie, seedsman, Toronto	20	10.2	2.5
Turkestan, through Currie Bros., seedsmen, Milwaukee.	15	10.3	2.4
Italy	15	9.9	2.3
France, Provence	18	8.9	2.1
Arabia	18	2.4	.6
Peru	.....	.0	.0

An important observation of this experiment is the fact that the Turkestan Alfalfa, the seed of which was obtained from Turkestan through the Department of Agriculture at Washington, gave good results, one of the strains coming third and another fourth in yield per acre. In comparison with this, however, it will be seen that the Turkestan Alfalfa obtained in this country and in the United States through the seed trade, gave very poor results, standing sixth and fifth, respectively, from the bottom of the list.

We have, during the last few months, made a somewhat extensive inquiry into Alfalfa seed growing in Ontario and find that in some parts of the Province the production of Alfalfa seed is becoming quite an industry. As both a crop of hay and a crop of seed can be produced in the same season many of the Alfalfa growers find seed production quite profitable. Alfalfa seed production is quite important, not only to those who produce the seed, but also to the farmers who are thus enabled to secure seed which has been produced in a climate which is similar to that under which the crop is to be grown.

I received replies from eighty-one Ontario farmers who have grown Alfalfa seed on their own farms from one year to fifteen, twenty, or even thirty years. The forty-three farmers who reported that they have grown seed for five years or more reside in the south-western part of Ontario and more than half of them are located in the counties of Haldimand and Lambton. The counties of Welland, Brant and Lincoln are also well represented and the counties of Kent and Wentworth are included in the list. The thirty-eight farmers who reported as having grown Alfalfa seed for less than five years reside in the seven counties already referred to and also in the counties of Elgin, Oxford, Waterloo, Huron, York, and Durham. It will, therefore, be seen that we have reports from thirteen counties in Ontario in which Alfalfa seed has been grown as a farm crop.

Every one of the forty-three farmers stated that he had used the second crop for seed production. The average yield per acre obtained by all of these forty-three farmers for all of the years in which seed has been grown is 2.07 bushels. The quantity of seed per acre seems to be influenced to a marked degree by the conditions of the season and by the quality of the soil. The prices realized for the seed have varied from $4 to $13 per bushel. The average price of all of the seed grown by the forty-three farmers in the different years has been about $8.90 per bushel. Thirty-seven farmers stated that seed production did not injure the plants. One grower mentioned that he thought it did a little, and another that it might if the crop were cut for seed too often.

The majority of the farmers who have had the greatest experience in the production of Alfalfa seed in Ontario consider that the growing of Alfalfa is almost sure to be increased for the production of seed and hay. Thirty-six out of the forty-three were quite decided on this point. The information gleaned from these practical farmers, who have in most cases made a marked success of Alfalfa seed production, should be of great value to other farmers in the Province. When we realize that the first cutting of Alfalfa will produce a good crop of hay, and that the second crop will produce in the same year fully two bushels of seed per acre, which will sell on an average of nearly $9 per bushel, or a total of from $17 to $18 per acre, and that the Alfalfa will remain in the land for a number of years without re-seeding, it shows not only the possibilities but what is actually being done in a somewhat extensive way by a number of our Ontario farmers. It is my intention to make a further inquiry into Alfalfa seed production in the different parts of the Province, believing that in a very short time the Alfalfa seed production in this Province will be quite ample for the home supply and with a possible surplus for export.

Ontario's Pasture Crops.

There are now over three million acres of pasture crops in Ontario. Both the quality of the pasture and the quantity per acre should be improved. Timothy is not particularly good pasture grass, and yet it is used more extensively than any other variety. There are too many old timothy sods in this Province.

A large number of varieties of grasses, clovers, and grains have been tested at the Ontario Agricultural College both singly and in combination for the production of pasture. The following mixtures are some of the very best:

Annual Crop for Pasture.

If a farmer realizes in the autumn or in the early spring that his pasture crop is going to be deficient for his requirements during the coming summer, he may be anxious to know what mixture to sow in the spring to furnish the best pasture the same season. After testing seventeen crops separately and six different combinations within the last fifteen years, we would recommend the following mixture:

Oats	51	lbs. per acre.
Early Amber Sugar Cane	30	"
Common Red Clover	7	"
Total	88	"

The oats and the sugar cane are mixed together and sown from the grain box of the seed drill, and the clover is sown from the grass seed box placed in front of the tubes of the drill. If this mixture is sown during the first week in May, it is usually ready for pasture about the 20th of June. The oats are early and rapid in growth; the sugar cane is later, stools well and thrives in hot weather; and the clover forms the principal pasture in the autumn. All varieties are readily eaten by the animals, especially the oats and the sugar cane. If desirable, the clover may be allowed to remain over winter to furnish one or two cuttings in the following year. The tramping by the cattle has not caused any marked degree of injury either to the plants or to the soil. During each of the past five years, we have had eight or nine acres of this pasture which has carried more than one two-year-old steer per acre. The animals have thrived splendidly, keeping in the best of health and gaining, on the average, about two pounds per day.

Pasture Crops for Two or More Years.

Many farmers seed their grain with Timothy and Common Red Clover, and, after taking off one crop of hay, use the land for pasture until it is again plowed. The clover soon disappears, and the timothy forms a comparatively poor pasture, especially in dry seasons. The following mixture is better for pasture purposes:

Red Clover	6	lbs. per acre.
Alsike Clover	3	"
Orchard Grass	3	"
Meadow Fescue	3	"
Timothy	3	"
Total	18	"

This mixture can be sown in the spring of the year either with or without a grain crop. It should be sown in front of the tube drill; the clover and the timothy from the grass seed box, and the orchard grass and the meadow fescue by hand. It could be used as a hay crop in the following year and for pasture afterwards. In comparison with timothy, this mixture will start earlier in the spring, produce a greener growth in the hot, dry months of the summer, and furnish a more abundant growth of leaves in the autumn.

Crop for Permanent Pasture.

Land which is not required in the regular rotation of the farm can often be seeded with a permanent pasture mixture to excellent advantage. From more than twenty years' work in testing different varieties of grasses and clovers, both singly and in combination, I would suggest the following mixture for a permanent pasture under average conditions of soil, drainage and climate:

Alfalfa or Lucerne	5	lbs. per acre.
Alsike Clover	2	"
White or Dutch Clover	2	"
Orchard Grass	4	"
Meadow Fescue	4	"
Tall Oat Grass	3	"
Meadow Foxtail	2	"
Timothy	2	"
Total	24	"

The seed of this permanent pasture mixture can be sown in the early spring, either with or without a grain crop. It is better to follow some cultivated crop which has been carefully looked after during the previous season. If the seed is sown alone, the tops of the plants should be cut occasionally during the summer and allowed to lie on the ground as a mulch. If a nurse crop is used, about one bushel of barley or of wheat per acre is recommended. As a rule oats do not form a good nurse crop for a permanent pasture mixture. The seed for the permanent pasture should be sown in front and not behind the tube drill. Some of the finer seeds can be sown from the grass seed box, and the others by hand.

Such a mixture as this, when once well established on suitable land, should produce a good pasture, appetizing to the animals, excellent in quality, abundant in growth, and permanent in character.

The foregoing results of the various experiments are presented with an earnest desire that they may prove of real value in the advancement of Ontario's agriculture.

Respectfully submitted,

C. A. ZAVITZ.

PART XV.

THE LECTURER IN ECONOMICS.

To the President of the Ontario Agricultural College:

Sir,—I have the honor to submit herewith the report of the Department of Economics for 1910.

The course of lectures outlined in the College Calendar have been delivered to Second, Third, and Fourth Year Students. Investigations similar to those outlined in my report for 1909 are still being continued through Junior and Senior Years, and excellent indeed are th reports submitted by many of the students.

At the close of winter term last April I was allowed to make an extended visit to the British Isles and Europe to study the methods of organization as employed by the farmers in those parts. This trip proved most instructive, and the work itself thoroughly enjoyable. Denmark is especially attractive for the study of Co-operative Production, Sale, and Supply, but perhaps not more so than Germany for its systematized Agricultural Credit Associations. This, I believe, is a very essential feature in a prospective co-operative scheme of any magnitude, and it is generally conceded by the foremost co-operators that the credit institution is really the proper place to start co-operation. However that may be, the credit idea is being widely extended at the present time and bids fair to become the keystone of the movement. I have made arrangements to use nearly every particle of information gathered in my teaching work at the College, and trust I may also be better able to serve the dem nds for outside work of this nature when time and opportunity permit. In all, I consider the time taken for this visit as time well spent indeed, and herewith extend my gratitude to you for making it possible for me to stay away so long.

Almost every day requests reach me for information upon various questions connected with the work of Farmers' organizations throughout the Province, and for the benefit of those who may read this report I am offering a few remarks upon some of the most frequent queries received.

Why do not Ontario Farmers Co-operate?

This is a question which the writer has spent many years trying to answer, and in this endeavor has made numerous investigations through the Province and elsewhere, and has received a great many reasons from different sources, a few of which are herewith submitted. It is alleged that Ontario farmers are too pig-headed and too selfish to co-operate; that they are distrustful, suspicious and disloyal. Some claim that the system of farming practised and the distances apart of the dwellings due to large farms are to blame. Other reasons offered are: mixture of races; inconvenience of transportation; outside monopolies; not enough of a certain article in a given locality; too much of party politics; friendship between farmers and local dealers; the independence of our rural population.

I must admit that up to a few months ago these were a very formidable list to me, and I was quite skeptical as to the chances of co-operative work ever being carried to such an extent in this country as it has in places abroad. Having examined the conditions existing among certain rural classes who have carried co-operation to the highest standard yet reached, I am satisfied that very few of the

reasons advanced above have any direct bearing upon this question of Agricultural Organization. Since making all possible enquiries into the habits and customs, the sense of honor and standard of morality of those farmers who have reached such a degree of excellence in organization and co-operative methods, I am quite satisfied that our own farmers are the equal, in all these particulars, of their brethren in Europe. The Danes, for example, do not co-operate because they love one another better than do farmers in the Dominion of Canada. It is not superior personal regard that induces them to pledge themselves into a bond of fellowship of "each for all and all for each." It is a matter of cold and calculating business. It is the result of a slow process of education which has shown the Dane that his home is on the farm or nowhere: that to produce a superior article is a patriotic act; that to sell jointly is a more remunerative method than to do so individually, and to buy wholesale a cheaper way than by single items.

It is the result of a system of education introduced in the Public and High Schools of Denmark more than half a century ago. The seeds of concerted action sown at that time have taken root, and during the past fifteen or twenty years are giving a most bountiful harvest Their united efforts have led them directly up to the problem of marketing, and no phase of their work is now destitute of a thorough investigation of the selling end. Most conspicuous in their co-operative system is their Information Department, a special bureau whose work it is to locate and examine markets, to study the demands of those markets, and supply all patrons with first hand information. Every farm and farmer is thus brought into the closest possible touch with the consumer, and the selling operation is part of his concern as well as the actual work of harvesting his crops and caring for his stock. How widely this system differs from the general practice throughout our farming communities, where little thought is entertained of reaching any market except that of the highest bidder in the neighboring village. Moreover, the farmer is not all to blame for his tardiness in the matter of co-operative enterprise. He is often encouraged to disregard the selling part of his business by public officials in influential positions. He is shown that the one thing needful for him is to have the quality of his products above reproach, and that the men to look after the marketing of the commodities are those who have given years of study to such affairs and are competent to meet all the exigencies of the case. Now, surely this is nonsense, however well meant the advice may be, and its effect is clearly retrogressive rather than progressive.

Then, again, all our Agricultural Institutions lay stress on the so-called productive side of agriculture. Farmers' Institutes, Live Stock Clubs, Fall and Winter Fairs, and almost all Agricultural Societies throughout the country, deal almost entirely with increase of production and improvement of quality. This is all right; this should certainly be done, but the other part should not be left undone. It is our opinion that the time has arrived when the question of marketing should receive immediate attention, and the education necessary for successful selling should commence at once.

If a little bleak and weather-beaten strip of land, much of it not unlike a reclaimed sand bar, can, through husbanding its resources and concentrating its forces by a scheme within the reach of every rural community, outstrip the whole world in the science and practice of agriculture, then what may we not reasonably expect from a real agricultural country, where the soil is fertile and rich and the climate ideal, if our farmers learned how to get proper value for their products as the Danes have done, and buy their goods at the proper price? The fact is, that, through co-operation alone, the farmers' net returns in some countries have been

doubled, and this is the main feature in the whole discussion. There is nothing fantastic or imaginative about it, neither are the results temporary or spasmodic. It has been a real and steady growth according to the dictates of modern business principles.

There is no demand for superior grey matter—no special brand of intelligence necessary to carry out this scheme; there is nothing whatever required of which the rural population of Ontario is destitute, except the proper assistance to start and the proper instructions with which to proceed.

Uniformity of Organization.

It is of paramount importance, in the vision of rural co-operation, to see not only the beginning of the road, but as far towards the end as possible. A few scattered and independent societies in this or that county or township, subject to every conceivable by-law and regulation, and every variety of liability, is next to useless as units of a larger scheme. We need a system under which every society, for certain purposes, such as supplying large orders, purchasing in job lot quantities, operating an insurance department, installing a telephone service or a credit bureau, may reunite so as to reduce expense to a minimum and secure a maximum of satisfaction. The possibilities of such a system are almost unlimited, and it is just this that our present existing societies require. No provision is made for joint action of all the societies of similar interests. Great reduction in the price of supplies has already been enjoyed by those societies capable of pooling their orders. Certainly sufficient has been done by a few of the Fruit Associations to point conclusively to the splendid advantages attainable under the wider plan. When a local society has been successfully organized and reached an advanced stage of business efficiency, it has then taken only the initial step in the direction of co-operation. It is when there are scores and hundreds of those in good running order that the great things in organization really come into view. But all depends upon the structure of these units. If they are formed according to a definite plan, or even if they have a sufficient number of features in common, to allow their further union, then directly we have in view the Provincial or National Association idea for the accomplishment of larger issues. It should be pointed out that this does not swallow up the individuality of any society in the case of the selling of its products under its own proud brand. Whatever provincial or national markings there may be, ample opportunity may be afforded for special distinctions. Our societies are too varied in structure to be welded into one harmonious institution for any purpose. Taken altogether they would form a most disjointed mass and quite impotent in the discharge of large transactions.

Cause of Failure.

From what has been said it is not hard to determine why Ontario has been termed "A Co-operative Desert," and why attempts to organize have in so many cases met with failure. Apart altogether from the reasons commonly advanced, such as:

Unreasonable and cranky members;
Starting on too large a scale:
Allowing expenses to run higher than the business had guaranteed;
Poor systems of book-keeping;
Bad by-laws and bad management;
Dishonesty;
No attention paid to the training of men:

and the thousand and one minor points which must be wiped off the slate, anyway, before sane men should attempt to do business jointly, there is the overwhelming reason of "an entire lack of system."

Re Government Assistance.

It is contrary, even diametrically opposite, to the co-operative idea to enter into a permanent scheme of drawing sustenance from any source outside the co-operative business itself. The keynote of the scheme is "help yourself," and this, notwithstanding the fact that Irish and Scottish farmers have received loads of ostensible philanthropy, at least, to assist them in starting and building their societies; and even Denmark has placed its Government behind the co-operative movement. But, in the case of Denmark, co-operation came first, government persuasion came after, and Ireland and Scotland must slough off their donation department. It is better not to receive aid at all if aid can possibly be avoided. Our Government has already provided a means whereby an ideal system of co-operation over a large section of the Province might be inaugurated. In each of some fifteen counties there now resides a permanent officer of the Agricultural Department whose duty it is to occupy the watch tower and see that all goes well with agriculture in his particular section, and that the best interests of his constituents are served; they are all similarly situated; their interests are similar and they receive their orders from a common source. It should not be a difficult matter for those men to agree on some definite policy and introduce such a system that would admit of the widest expansion. During the past season the Government has borne the expense of training a number of farmers to co-operate, largely to suit the needs of an Independent Produce Company. Of course the farmers have stood to gain a little by the scheme, but since the Government is paying the greater part of the price, it would be as well for the farmers to get the full returns, including credit for any superiority in quality that might come as a result of their work.

During the past four months scores of enquiries have reached me as to how the Gunn Co.'s egg circle system compares with the Danish System of gathering, grading, candling, stamping and marketing. My reply has invariably been that it compares very favorably indeed. The fact is that the Gunn people have made an almost exact duplicate of the Danish system, and they have done so with a decided advantage to the producer over his previous position. Three cents apiece for every egg they can produce from October 25th, 1910, to March 1st, 1911, is one of the advantages which the farmers secure by being members of the Gunn circles. When could they say till now, who talked of eggs, that such a price was not out of the question? Again this gives a tremendous impetus to flock improvement, both in numbers and in quality; to the eradication of disease: to the adoption of scientific principles in breeding, feeding, housing and general management; and to the practice of all modern views of collecting and protecting the eggs themselves.

Wherein, then, is there room for complaint, if complaint there is? Surely no person could expect a private enterprise to do more for the farmers than this company is doing. The Company agree to bear the expenses of organizing; the expenses of collecting and hauling; the expenses of candling and storing; and finally of grading, packing, and shipping. To my mind, no group of farmers should expect an outside company to do more for them than this. So my conclusion is that the Gunn Company have made good use of the Danish system and used the Ontario Farmer "white."

But yet *"delenda est"* is the proper verdict of this system, which is, as one well termed it, a "pseudo-co-operative scheme." It must be destroyed in its present form and raised again in a true co-operative form in which those who produce the goods will handle and dispose of them to best advantage. One of the surest signs of extravagance is to see a person accept a smaller price for an article than its true value. Three cents is not enough for an egg that will fetch four, five and six cents over in the next town or village. If an egg is worth six cents in Toronto or Montreal it should be worth as much in Galt minus the cost of transportation to Toronto or Montreal.

This is how it is that co-operation has been such a marvellous success wherever it has been attempted in a business-like manner. The organization knows exactly where all their possible markets are located, and the price of the products in question is known every day in the year and in some cases every hour in the day. Furthermore, the cost of placing the article upon any one of those markets is known to the smallest fraction. This is one of the most important parts of the organization's work, to secure and make known this information. But no member of one of the Gunn circles has a right to ask the Gunn Company what price they obtain per egg or per dozen eggs upon their final markets. It would be a piece of rank impertinence. The Gunn Company have formed no agreement with the farmers of Ontario and Peterborough Counties that the latter shall have free access to their books and to all their transactions at any time, and to my mind they would be very foolish if they did. But so far as I have been able to glean they are doing all they promised to do in the most satisfactory manner. Even in the matter of candling and the administration of final judgment upon the quality, both of which offices the Company has reserved for itself, there comes no real murmur or complaint. It seems to me that the farmers around Whitby and Peterborough have landed into the arms of a pretty honorable Company. Indeed, this matter of candling and of forming the proper estimate of each producer's article are the features which cause the most serious trouble in places where co-operation has reached the highest degrees of perfection. We would have received no shock to have heard long ere this of the withdrawal of a whole circle on these two points alone. There would seem to be some justification for the oft repeated story "that farmers will depend upon anybody's judgment rather than their own."

I have already pointed out the chief advantage to farmers of the two counties which have joined the egg circle scheme; it lies in the receipt of a considerable sum of ready cash for a farm commodity hitherto not regarded at all or very slightly recognized. The disadvantage and the obvious iniquity lies in the fact that the eggs are no sooner laid than they pass entirely out of the farmer's hands, sans credit, sans marks, sans everything. That is to say, after he has taken the pains to gather his eggs from regular nests only, and to discard all others; after he has delivered them twice a week in summer and once in winter; when he has culled out the very small and the oversized, rough shelled and ill-shaped eggs; when he has complied with all the rules relating to the scientific handling of both birds and eggs; the pure, perfect article is disposed of under somebody's else's brand. They have done all the drudgery of co-operation; they have complied with all the rules necessary for a true co-operative Association; they have agreed to make good to the Company any flaw or apparent breach of promise or of contract; they have done everything except claim the honor of their noble exertions. They have "sold their birthright for a mess of pottage." The brand of a perfect article is to the producer of that article the breath of life.

But we intimated that this system must change and give place to a co- perative system. Let us be plain about this, for many there be who imagine that these are co-operative egg circles. Let us say that there is no co-operation about the system except what is sufficient to collect in one bulk a sufficient quantity of eggs of a certain quality to make it a circle, and to help the producers to realize a certain part of the increased value of the eggs. What we understand by a co-operative society is one through which the members receive the full value of their commodities, minus the cost of placing it upon the market in the required form. Sometimes in the case of a very distant or foreign market, it is impossible for the Association to deal directly with that market, but whoever stands between the organization and the final market bears the same relation to the Society as a book-keeper or a stenographer receiving his pay, on a pre-arranged basis, for the service rendered. In no case should the article pass out of the producer's control unless to satisfy the demands of what is known as "a good business deal" or "the best policy under the circumstances."

The idea of the producers selling under their own stamp is of paramount importance. But to do this they must have someone to sell to, some ready market. This seems entirely within the realm of possibility. Surely it should not be difficult to find a direct market for that class of article which Ontario and Peterborough counties are putting up. If a market of such dimensions as would absorb the products of a few counties could be found, for a beginning, an excellent start could at once be made. Once established there is no question about the progress of the system. It is a matter of plain dollars and cents after that.

The Question of Liability.

The difference between limited and unlimited liability is simply that in the former case each member is responsible for the Company's debts to a certain fixed amount, often not exceeding the amount of stock the individual holds, whereas in the case of unlimited liability each individual is responsible to the full amount of the Company's indebtedness. Thus the creditors are at liberty, in the case of the collapse of a society, to recover the whole of the amount to which the society has become involved, from a single member. Provision, of course, is always made among the members themselves for such an emergency, so that in the final settlement, each member will be obliged to bear his proportional part, thus distributing the loss over the entire membership, but so far as the creditors are concerned they cannot possibly lose, if there is sufficient property in the possession of the co-operators to make good the liabilities of the Association. Now the advantages of this system are obvious; banks and loan companies, considering this the best form of security, are not only willing, but eager to lend money to this kind of Company at the lowest possible rates. The use of such money is at once a great boon to the society, which may now avail itself of a sufficiently liberal supply of capital to meet all necessary requirements. Furthermore, failure is now outside the realm of probability if not possibility, which gives the society a still greater impetus. There is no withdrawal of members under such a system, neither is there undue rashness in plunging into extravagant expenses. In all, unlimited liability seems to be just what co-operative societies need to cure them of most of their diseases and complaints. Underhand dealing and disloyalty are reduced to a minimum where unlimited liability is found; distrust and infidelity are almost unknown; and the strictest care is taken in all transactions. There is really no disadvantage, for the only place in which trouble could occur is in the case of failure, but since the causes of failure are removed the results of failure may be disregarded.

Most of the so-called co-operative societies of the Province of Ontario are in reality Joint Stock Companies. They issue shares and declare dividends. This is not true co-operation. This kind of co-operation is known in almost every private enterprise in the country. If the society is successful the patrons who hold shares get more out of the association, other things being equal, than those who only buy and sell through the society. They get a percentage on their investment which is perfectly legitimate but not co-operative. And when one is asked "What's the matter with co-operation in Ontario" he is not far astray in answering "There is no real co-operation in Ontario." This Joint Stock or Semi-co-operative Institution has done a great deal for agriculture and horticulture in this Province, however, and has not yet reached its limit by any means, but in the long run it must fall short by a very wide difference of such an achievement as might be realized under the proper co-operative plan. No member is asked or allowed to take shares in a co-operative society in which members pledge themselves "each for all, and all for each." Indeed there are no shares. The necessary capital is obtained upon the cheapest market according to the plan of Unlimited Liability. A Joint Stock Company has for its main object to earn dividends for its shareholders; a co-operative society ignores dividends and devotes itself to a life of service.

The Place of the Middleman.

It is wrong for public servants, and other servants as well, to utter curses and abuses against the men who perform such a service to the agriculturist of this country as those, so-called, wicked middlemen perform. The work of collecting, grading, packing, storing, hauling, distributing and marketing must be done; the expense of finding markets, and special markets must be borne by someone; the cost of agents, of insurance, of risk, and unavoidable loss must be met. At the present moment the withdrawal of the middlemen would leave the Ontario farmer in a disastrous situation. It might ruin him. Besides, middlemen are not a set of thieves and highway robbers; of rascals, scoundrels and parasites. They are engaged in just as legitimate a business as the man who makes the furrow and hoes and cultivates the crop. The man who buys apples for the lowest possible price and sells them for the highest he can obtain is no more of a robber than the man who stores his fruit and vegetables in October when they are plentiful and cheap, and sells them at Christmas when they are scarce and dear. As a matter of fact, with what organization we have in this Province, the advantage of the foreign market would be entirely lost but for the middle agency. Indeed the middleman becomes in an economic sense a part producer, for viewed in this way no article may be said to be produced until it reaches the consumer.

We may as well take it for granted that this middle work must be done, for the cases in which the farmer can reach the consumer directly are so few as to be negligible. Even with the most successful organization, this work of reaching the consumer is strongly in evidence. It is the chief office of a Sale Society. The advantage of the farmer is that through his society he holds control of his products either till they reach the final market or as near it as may be consistent with good business tactics. Moreover, the society is now in a position to bargain for its transportation since it has large contracts to let. The profits which hitherto went to outside dealers are retained within the society to still further serve the interests of the members. The problem is not one of destroying a foe in the form of a middleman; the question is whether or not the Ontario farmer is capable of managing his own affairs, including the marketing of his products. If it can be shown that he

is equal to this work, then he is obviously unwise to allow some other person to do it for him. For, granted that the middleman is honest and fair, frank in bargaining and faithful in performing, he is still a business man and quite justified in making a busness deal. It is, to our mind, the business of the farmer to control his affairs to the fullest possible extent: and to sell an article of produce at a lower price than might possibly be obtained is surely a token of blind or wilful extravagance.

The following are a few of the questions I was asked to investigate in Denmark by some of our most prominent co-operators in Ontario:

1. What means do the Danes practise to secure membership?
2. How do they finance when they have to raise any large sum of money?
3. What percentage of the people join the associations?
4. What are the chief difficulties met with in co-operation in Denmark?
5. How do they educate for betterment of quality?
6. How do they deal with members who will not improve and produce good quality?

1. This is no longer a very serious question for the co-operative societies of Denmark. While they were passing through the experimental stage, a vast amount of missionary work had to be done, a good deal of which was accomplished through the secretaries and managers of the associations, through the Government officials sent out by the Agricultural Department, and by means of literature distributed through the Federal Association Board which has a special department for pushing organization work. All of these agencies are working to a more or less extent at the present time, but the chief instrument in gaining members now is the unique prosperity of the whole movement and the wonderful advantages obtained through the societies. These surpass all other forms of advertising and exhortation.

2. The system of unlimited liability is universal in Denmark. Under this system capital takes no risk, and hence it is to be obtained in almost any quantities at the most moderate rate. In July of the present year the writer had the pleasure of visiting a new dairy establishment in the city of Odense, on the Island of Fyn, that had just been completed at a cost of $100,000, all obtained through the security of the members. The members are pledged to support the institution; if they withdraw they are liable just the same, and if they stick success is assured. At Kolding and Horsens again are bacon-curing factories and equipment which have in each place cost upwards of this amount of capital, all raised in the way indicated above and now entirely paid off, thus placing the entire outfits in the sole possession of the members.

3. There are many parts of Denmark where practically every farmer is a member of one or more societies. Indeed, except in the case of very large land owners, this is the prevailing condition. Taking the whole rural community into consideration, about 90 per cent. would be a close estimate.

4. The chief difficulties that have been met with in co-operative movement in Denmark are:—

Lack of enthusiasm on the part of the farmers.

Jealousy of the salaried officials and those who, through using their opportunities to the fullest extent, naturally prospered best under the system.

A tendency for certain members to ignore rules, regulations and bonds and to break away when circumstances arose that had to be obeyed to preserve the life and character of the society. It is hardly what might be called disloyalty but rather dissatisfaction.

To get the ordinary member to understand that large allowances of money are necessary to carry out large ideas and enterprises and that the cost of certain investments are justified by results obtained.

The opposition of middlemen and local dealers, selfishness, shortsightedness, pigheadedness and independence, all these were just as much in evidence in Denmark, to say the least, as ever they were in the Province of Ontario. I would not say that many of these are difficulties just now, but they were all to be met with at some stage or other of the movement. In recent years the struggle with Trusts and Combines, as for example the "Pork Ring" in Britain, has in some cases been very acute. This organization a few years ago attempted to monopolize the whole bacon industry of the British Isles and fixed the price according to its own ideas. Immediately the Denmark Associations opened up stores in London and other cities in England and offered the Danish product upon the retail market, finally succeeding in breaking this notorious "Ring." Again, tariff legislation in Germany at one time threw back upon the farmers of Denmark a staple article of their produce, thus threatening to swamp the industry entirely in that particular line. Directly the co-operative societies set to work to prepare this article in an attractive way for their home market; they advertised it and encouraged its consumption at home with such success as to make the loss of the German market entirely unfelt. Again, other agricultural countries, such as Ireland and Scotland, adopting the Danish plan of marketing, have made it incumbent upon the Danes to keep doing better still, and this task together with the naturally poorer soil of Denmark has kept the Danes busy and busier from year to year.

5. There are really only three lines of agricultural production in Denmark—butter, bacon and eggs. Each of these three has a large staff of instructors, advisers and inspectors continually going up and down the country hearing complaints and answering questions; teaching, encouraging and chiding; urging and assisting in every possible way. These are maintained only in part by the Co-operative Associations, the government bearing a share of the expense, but in all matters pertaining to agriculture the government and the co-operative societies go hand in hand. Shows, fairs, and competitions are conducted in a similar manner, and all these have for their object improvement in quality. In these ways a watch is kept on every member, and it is next to impossible for a member to dodge the issue of improving his products from month to month and from year to year.

6. Now when a member in spite of all these precautions and opportunities steadily refuses to do better he must answer to the society. If a member of a Dairy Association, for instance, sends up an inferior quality of milk to be manufactured into butter, or if there is an abnormal falling off in quality he is very soon brought under the rod of correction. The common practice is for an employee of the society to call at his farm and get right to the quick and heart of the trouble. If carelessness is found, the member is fined, and if he is heedless he is expelled. In the same way a member found guilty of sending a bad egg to the Association's packing house is forthwith warned and fined. If he does it again he is asked to retire. The best stock may always be obtained either through the society or its ally the Government, and there is next to no excuse for a member to drag behind and become an indifferent farmer.

Respectfully submitted,

H. H. LEDREW.

PART XVI.

THE DIRECTOR OF HOME ECONOMICS.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith the seventh annual report of the work of the Home Economics Department for the year 1910.

The Work in General.

The Home Economics Department has few changes of work to report save in the way of strengthening the courses offered to the girls who come for training in household affairs, or for preparation for professional work in teaching or housekeeper field. Contrasting the course of 1904 with that of to-day, it is possible to point out certain advances. Chief of these is the present emphasis laid upon individual experience of practical work. The general public scarcely understands how far this has developed. Formerly this was meagre and confined to class lessons in cookery and laundry; it has expanded until it now includes carefully supervised individual practice in all forms of cleaning, in the preparation of meals, in the waitress work of serving meals, in marketing, in the clerical work of keeping Institute accounts, in the apartment housekeeping and in the planning and execution of special meals for a large number of visitors. It is not a question of getting necessary work done, for in most cases it would cost less money to employ skilled labor for the work than to pay for the supervision of the unskilled student. It is rather a question of bringing together the student and the valuable training which comes from testing her grasp of theories and instruction by applying them to immediate and everyday problems and confronting the results. For instance, the girl whose new gown gets badly stained, carries it to the laundry teacher who discusses chemicals and superintends operations until the offending stain is gone; the girl whose silk waist comes out of a session in the sewing-room with invisible repairs, has a new respect for neatness and accuracy; the marketing student struggles with the trials of a waiting class with the shops a mile and a half away; the Homemaker in the Apartment discovers that high heels and backaches are apt to go together, and that her head was made to save her heels; and thus the whole student body learns the meaning of co-operation when a whole function moves smoothly because of careful plans and each attending to her share of the work. The artificial problems frequently seen in class teaching will never give the same training. There are many difficulties in the way of this impressive training; sometimes it is the difficulty of finding the work when the student is ready, sometimes it is not easy to secure the necessary supervision, sometimes it is an attitude of mind which fails to recognize that the worker may dignify any work; but we are developing new ways, and we hope the next seven years will see it more fully worked out.

The Normal Course in Domestic Science.

Twenty entered the two-year course in 1908; eighteen passed on to the senior class, and three others who had dropped out for a year re-entered. Twenty passed the final examinations and have received the Macdonald Institute Teachers Certificate in Domestic Science. Miss Edna Bryans, who was dangerously ill at the

time of the final examinations, was granted her Teacher's certificate by a vote of the faculty, on her standing in the previous term examinations. Of the sixteen admitted to this course in September, 1909, fourteen have passed on to the senior class and are now in attendance.

There were many more applications for this course than could be accommodated last September; sixteen were accepted and fifteen are now in attendance. The rule of holding all applications for this class until the end of June, and then giving preference to the candidates of greatest maturity, scholarship and household experience has strengthened this class considerably.

Owing to the large number in the senior class, but four experienced teachers could be admitted to the One-year course last September. All passed the final examinations in June, 1910, and have received the Macdonald Institute Teacher's Certificate in Domestic Science. There were nearly thirty applicants for this course last September; we were able to accept eight, who are now in attendance.

The Guelph public schools have sent us four classes weekly for our practice teaching, but the average number in each class is smaller than usual.

The Housekeeper Course.

Eight entered the course in September, 1908; six passed on to the senior class, September, 1909; all passed the final examinations of June, 1910, and have received the Macdonald Institute Housekeeper Certificate. Ten entered the course, September, 1909; six passed on to the senior class, and two more entered by virtue of Homemaker work, September, 1910, making eight now in attendance. Thirteen entered the junior class last September. More applications were received but could not be accepted because the candidates were unwilling to board outside. These students look forward to institution housekeeping, and it seems essential for them to live in residence.

The field of institution housekeeping offers fine opportunities to the women who have had good experience in the management of the family home, and are now thrown on their own resources. Demand for the trained housekeeper is greater than for the Domestic Science teacher; her initial salary is equal to and frequently better than that of the teacher, and her social position is good.

All of this year's graduates who desired work secured positions immediately. One went to manage a summer resort dining-room near Sarnia, thence in September to the State Agricultural College in Oregon; another to manage the Hamilton Milk Depot for the Summer, thence to a housekeepership in St. Paul; and a third to the housekeepership of the Y. W. C. A. in Quebec City.

The following Housekeeper graduates having completed six months' satisfactory housekeeping in an institution, have been given their Professional Housekeeper Certificate:—

Miss Jessie Blyth, Asylum for the Insane, Penetanguishene, Ont.
Miss Maud Davison, Epworth Hospital, South Bend, Indiana.
Miss Nealina Macmillan, Macdonald College, Que.
Miss Marion Rutherford, Brandon College, Brandon, Man.

The Homemaker Course.

Thirty entered this course in September, 1909; ten passed the final examinations last June, and have received the Macdonald Institute Homemaker diploma. Forty-five were admitted to the course last September, and are now in attendance.

The Short Courses.

These very practical and thorough short courses continue popular.

The Short Course in Domestic Science had in attendance in the Winter term, January to March, 49; in the Spring term, April to June, 34; and has in the present term, September to December, 17. The smallness of the present class is entirely due to the want of residence room, as many more applications were received.

The Short Course in Sewing is now well established and its value proven. Most of the members of the classes were previously students in other courses, who watched the work of the Sewing Course and thought it worth returning for. There were in the Spring class 11; and the present class has 12. Both classes made an attractive exhibit of the work accomplished.

The Summer Course in Domestic Science.

As last year, the work was limited to practical lessons in plain cookery and laundry, and lectures on home nursing and sanitation. It continued four weeks and the time was divided as follows:

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
8.45– 9.35.....	Home Nursing.	Sanitation.	Home Nursing.	Sanitation.	Home Nursing.
9.35–10.25.....	Cokye	Cookery.	Cookery.	Cookery.	Cookery.
10.05–11.15.....	"	"	"	"	"
11.15–12.05.....	"	"	"	"	"
12.05– 2.00.....	Dinner.	Dinner.	Dinner.	Dinner.	Dinner.
2.00– 2.50.....	Laundry.	Cookery.	Laundry.	Cookery.	Laundry.
2.50– 3.40.....	"	"	"	"	"
3.40– 4.30.....	"	"	"	"	"

There were eighteen teachers willing to give up a month's holiday immediately after the close of their year's work, and in the hottest weather, in order to learn systematic methods in the above subjects. It says much for their keen interest that they were enthusiastic workers to the end of the course.

Student Workers.

Eight girls have this year availed themselves of the opportunity to secure a short course in domestic science in exchange for four months dining-room service in the Hall. Three served during the Winter term, three in the Spring term and two are now serving.

Special Lectures, Meetings, etc.

Special marketing lectures were carried out by College Professors as follows: Fruits and Vegetables, Prof. Crow; Canned Foods, Prof. Edwards; and Cereals, Prof. Harcourt. We are indebted to Mr. Hales, of Guelph, for an instructive illustrated lecture on meat cuts, given in his own shop. The Homemaker class spent an afternoon watching him cut up several sides, listening to his descriptions and comparisons of the quality and market value of the different cuts and asking innumerable questions. We hope this lecture may be duplicated next year.

The senior Normal and Housekeeper classes spent a day in Berlin with Prof. Harcourt, visiting the manufacturing establishments which produce beet sugar, whitewear, buttons and rubbers.

Miss Roddick and Miss McLennan prepared an article on the food value and cookery of vegetables, for Mr. Putnam's use in the recent Women's Institute Bulletin on Fruits and Vegetables.

This department was represented by myself at the Ontario Education Association last Spring and at the recent Women's Institute Convention. We were also represented by myself and seven graduates at the first Institution Management Convention, which was held at Lake Placid, New York State, in June.

The experiment of increasing the practical waitress-work of the students in order to secure better training, has been most satisfactory. The present arrangement is that 24 girls at a time are assigned, to waitress work in Macdonald Hall, each serving at one meal a day for three weeks, taking breakfasts one week, dinners the next, and so on. Their meals are especially provided for with ample time allowed, and their waitress work is taught and supervised by the Macdonald Hall housekeeper. It adds considerably to her work, not only through the time devoted to the students, but through its interference with the regular routine of Hall service; but the value of the training justifies it. Miss Tennant is working it out most satisfactorily, and we recognize how large a measure of its success is due to her tactful handling.

Women's Institute Work.

The effort to place the resources of our books, magazines, and pamphlets at the service of the Women's Institutes is apparently appreciated. In the first eleven months of this year 606 requests for information were answered with 554 packages of material. Most of the requests came from Women's Institutes members who had undertaken to prepare papers or talks for the local meetings. The following lists show the varied nature of the information sought and the mass of material sent out.

Requests for information on

Home interests	46	Education, especially in home economics	42
House and housekeeping	109	Clubs, social service, etc	101
Food and cookery	179	Gardening	15
Dietetics	16	Miscellaneous	33
Health	12		
Household finance	23	Total	606

Material sent out in answer to 554 inquiries.

2,137 pamphlets, magazine articles and clippings.
121 books.
7 special letters of information.
32 letters regretting that all material was already loaned.
20 letters regarding subjects not dealt with by our collection.

Other departments of the College have aided the work by answering questions our collection could not satisfy, notably the Horticultural and Chemical.

About a thousand pamphlets and articles have been catalogued, prepared for circulation and added to our collection.

Many appreciative letters accompany returned material, and it seems well worth while to continue the work. We wish therefore to repeat our invitation to people seeking information which our collection may furnish, and to welcome their inquiries.

Staff Changes.

This department suffered serious loss in the death of Miss Greist, the senior sewing teacher. She was taken suddenly ill late in August and passed away in October. She was able to gauge the needs of the Short Course and Homemaker students, and developed admirable sewing courses for them.

It is always difficult to find a satisfactory sewing teacher, and we had more than the usual trouble owing to our immediate need. No Canadians were available, but we finally found Miss Alta Dickey, of Montclair, N. J., who was first engaged as Miss Greist's substitute. She has made a satisfactory beginning and we hope will remain with us.

Dr. Ross secured a year's leave of absence beginning in September. Her Physiology and Home Nursing lectures are being carried on by Mrs. F. C. Hart, a graduate of Teachers' College, Columbia University; her education lectures by Prof. A. L. McCrimmon of McMaster University; and her gymnasium work by Miss J. Magwood, a graduate of the Margaret Eaton School of Expression, Toronto.

Equipment, Etc.

The one great equipment need is of course more residence room. The effect of the new rule of not accepting any but farmers' daughters for Homemaker and Short Courses until sixty days before the opening day, was fully felt this term when we had to write a long list of town and city girls that the farmers' daughters had crowded them out.

I beg to acknowledge the efficient work of the other members of the Home Economics staff, and the assistance so freely given us by other departments of the College.

Respectfully submitted,

M. U. WATSON.

PART XVII.

THE PROFESSOR OF MANUAL TRAINING.

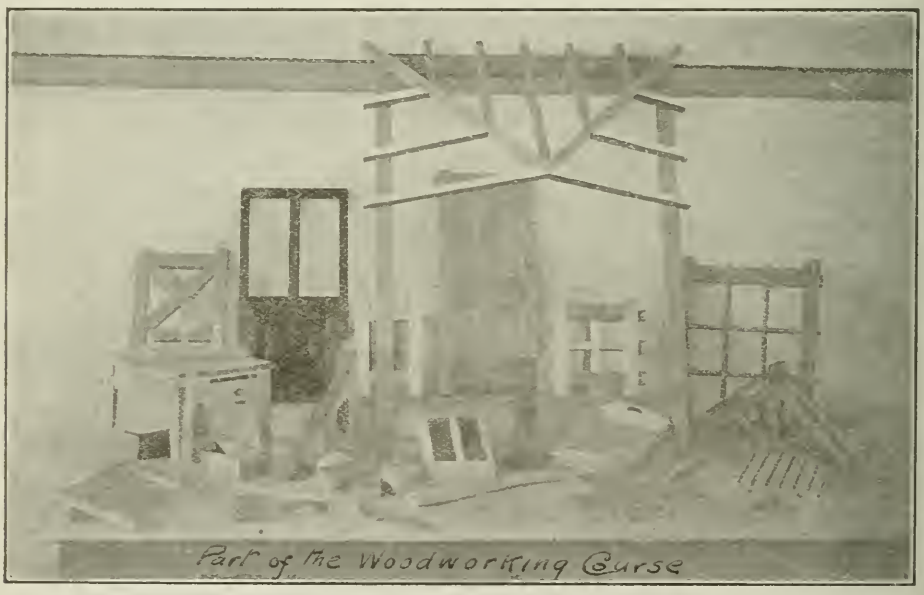
To the President of the Ontario Agricultural College:

SIR,—I have the honour to submit my seventh annual report on the work of the department of Manual Training and Farm Mechanics for the year 1910.

INSTRUCTION.

The staff of this department has been mainly engaged in giving instruction to students attending the

1. Normal Course in Manual Training.
2. Agricultural Course—Woodwork and Drawing—1st Year students.
3. Agricultural Course—Metalworking and Farm Mechanics—2nd Year students.



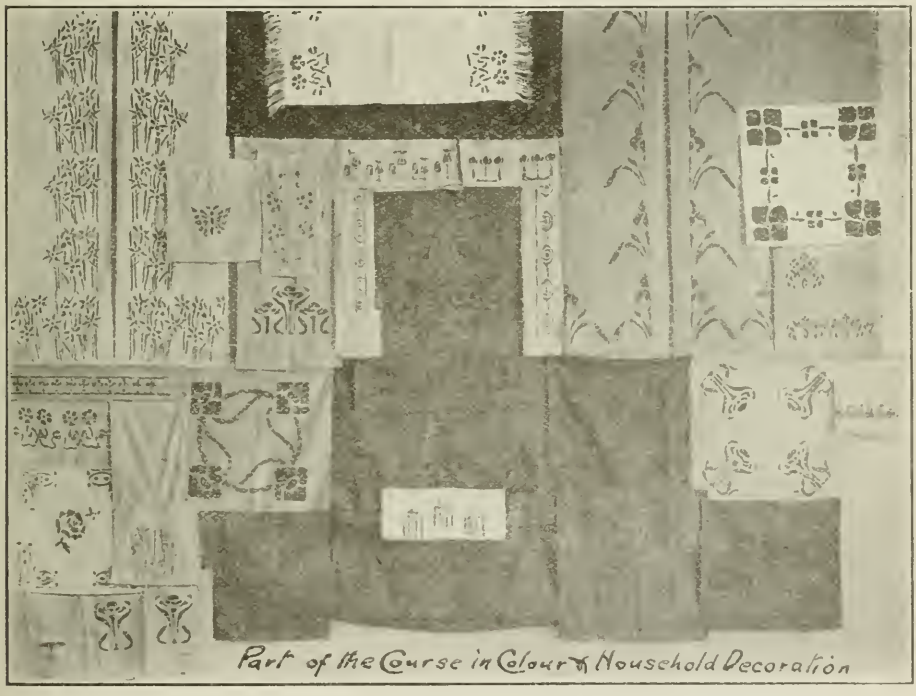
Part of the Woodworking Curse

4. Plain Carpentry—Students of Macdonald Institute.
5. Color and Household Decoration, Macdonald Institute.
6. Special Three Months' Course in Industrial Arts for Students from the Normal Schools of Ontario.
7. Summer School—Teachers from the Public Schools of the Province.

Instruction in Courses 1 to 5 was given as outlined in the College Calendar. The text of the special Three Months' Course in Industrial Arts was given in my last report and requires no extended notice here as to the nature and scope of the instruction. The work of the Summer School was mainly confined to Woodwork and Drawing, Construction Work and Art. But there were five students in attendance continuing their work for the Full Certificate in Manual Training. Courses 6 and 7 are undertaken by the College with the co-operation of the Department of Education. Extra help had to be secured for these two courses. Miss

M. Long, for some years Art Instructor in the Brantford Collegiate Institute, was engaged to take the Art and Constructive Work for the Spring Term and Summer School, and Mr. R. W. Moffatt, B.A.Sc., School of Practical Science, Toronto, for the Mechanical Drawing during the Spring Term. Instruction in Woodwork and Woodworking Tools, etc., was given by Mr. Kendall; while the writer took charge of the Normal Course students and the classes in Color and Household Decoration. The services of Mr. R. Wade, B.S.A., were again available in the Fall term. The assistance of Mr. Wade during this term relieves us of a part of the heavy work which is usually crowded into this period of the course, by taking a section of the Second Year students in farm implements.

It is with much pleasure I hereby acknowledge the very efficient, systematic and persistent work accomplished by the staff in the task apportioned them.



The Fall term of 1909 opened with 171 students in attendance.

Normal Course	4
Second Year—Agricultural Course	89
Woodworking (Macdonald)	24
Color and Household Decoration	54

Winter Term.

During this term lectures and practical work were given.

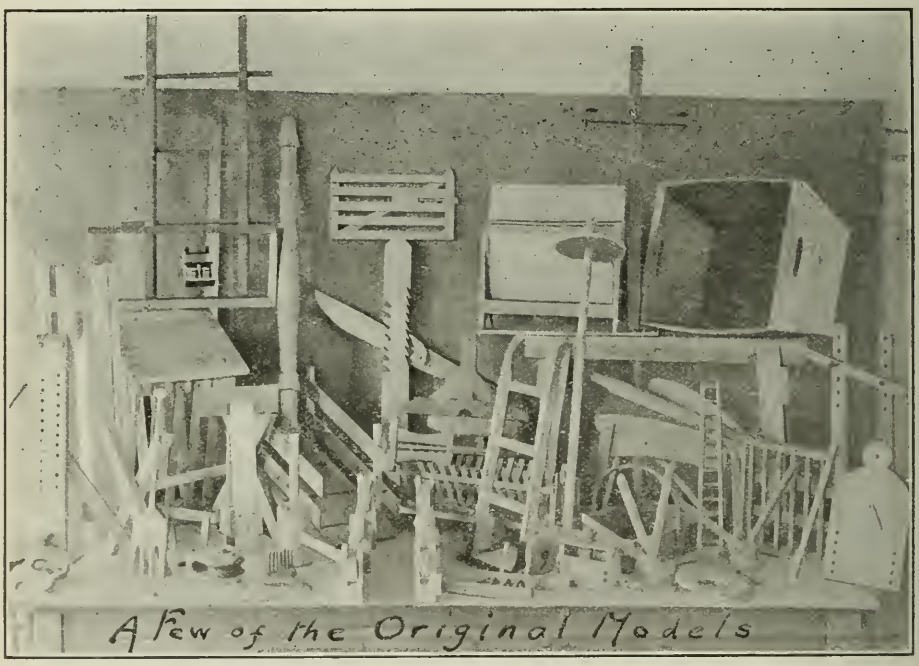
In Woodworking and Drawing, 117 First Year Agricultural students; in Color and Household Decoration (Macdonald), 28; in Woodworking (Macdonald), 35, and in subjects comprising the Teachers' Normal Course to 4 students.

In the Woodworking and Drawing Course for the First Year students an attempt is made to lay a good foundation of a general character as will best serve the purpose of the student in his after life on the farm. At the same time to see that his acquaintance with tool and material is broad enough to allow the fullest

development, and to permit of his ready adjustment to new and varying conditions. Efforts are directed to inculcate those mechanical elements which are common to most trades, and to acquaint the student with such materials, tools, and processes as will render the individual efficient and self reliant.

In drawing we endeavor to lead the student to understand and read intelligently an ordinary plan and elevation of a building through the drawing of simple objects and the copying of drawings of houses, cottages and barns.

At the end of the term the student is requested to draw and make an original model, that is, a model he has not already constructed during his course. He has full freedom in choosing, drawing and constructing this model, but it must be something that is useful on the farm. Some of these original models are given in the accompanying photo.



SPRING TERM.

Industrial Arts Course. The students of the Industrial Arts class were:—

Ansley, Laura A., Wingham, Huron.
Barker, Vivian J., Pembroke, Renfrew.
Blyth, Mary E., Orchard, Grey.
Bogue, Bessie, Strathroy, Middlesex.
Calder, Sarah C., Mt. Forest, Wellington.
Carroll, Clara E., Watford, Lambton.
Carty, John J., Elgin, Leeds.
Chalmers, Pearl, Strathroy, Middlesex.
Charlesworth, E. M., Pembroke, Renfrew.
Dance, Helen B., St. Thomas, Elgin.
Davidson, T. W., Camborne, Northumberland.
Ewald, Emily, Port Elgin, Bruce.
Gibson, Ida, O'Connor, Thunder Bay.
Gillespie, Lynne, Seaforth, Huron.
Grant, Marion, St. Mary's, Perth.
Gummow, Chas. R., Cobourg, Northumberland.
Hawkins, Erie T., Listowel, Perth.
Lewis, Ella M., Paisley, Bruce.
Longthorne, Pearl, St. Mary's, Perth.
Macdonald, Florence, Ridgetown, Kent.
Mair, Jean, Summerhill, Huron.
McCallum, Georgia, Shakespeare, Perth.
McEachern, Elma C., Sault Ste. Marie.
McGuire, Adam, Cookstown, Hastings.
McKitterick, Elsie, Shelburne, Dufferin.
Moore, Florence, Speyside, Halton.
Phelan, Frank J., Chepstow, Bruce.
Preston, Elsie, Sault Ste. Marie.
Stewart, Mary M., Renfrew, Renfrew.
Tench, Alice, Newmarket, York.
Thorpe, Edward H., Hulbert, Dundas.
Wilson, Bessie, Wardsville, Middlesex.
Wilson, Gertrude, Windsor, Essex.
Worthington, Margaret A., Clinton, Huron.

Each of these students received a certificate of attendance from the College, and were also granted by the Department of Education a certificate in Industrial Arts. In awarding these certificates, the daily record of the class work as well as the results obtained at the final examinations were taken into consideration. Of the thirty-seven students entered, three left before the end of the term. Mr. J. G. Staples, Bethany, found the work too arduous and withdrew at the end of the first week. Miss G. E. Anderson, Sarnia, did not feel equal to the close application needed to successful work and retired from the class on the 13th June, and Miss I. B. Johnston, Lynedoch, left on the 29th April, having accepted a position. The Industrial Arts and the Normal Students visited the following local industries: The Raymond's Sewing Machine and Cream Separator Factories, Bell's Organ and Piano Factory, The Carpet and Spinning Mills, all of Guelph. In company with the Nature Study class, they also visited the Marden School, situated on the Elora Road, about two miles out of Guelph. Here Mr. P. H. Buchanan, the Principal, devoted the greater part of a morning in explaining his method of experimental work in school gardening, and a profitable, as well as an enjoyable time was spent in viewing the various plots.

Summer School.

There were present in all forty-two students:

Art and Constructive Work—
Miss Hattie Barmby, Caledon East, Peel.
E. Bruce, Toronto.
G. E. Burford, West Toronto.
A. M. Burke, Institution for the Deaf, Belleville.
S. Pearl Code, Trowbridge, Perth.
Margaret Copeland, Kirkton, Perth.
Bessie Corbett, Belleville.
Eleanor Duncan, Brantford.
Nettie Feeney, Madoc, Hastings.
Ella J. Hedley, Canfield, Haldimand.
M. E. Jamieson, Lynn Valley, Norfolk.
Aletha E. Kelly, Woodstock, Oxford.
R. A. Langford, Warkworth, Northumberland.
A. M. Lanskail, Toronto.
G. E. Lounsbury, St. Catharines, Lincoln.
A. B. Macdonald, Picton, P.E.I.
Aletha M. McKay, Belleville.
Tena McKillop, Eagle, Elgin.
A. E. Ness, Port Dalhousie, Lincoln.
Eva Teeter, Smithville, Lincoln.
A. J. Tweedle, Strathroy, Middlesex.
J. D. Thompson, Tillsonburg, Oxford.
L. Waterman, Bensford, Peterborough.
Susie Wessel, St. Catharines, Lincoln.
M. Chapman, Campbellville, Halton.
Jas. Corrigill, Elmira, Waterloo.
J. T. Curtis, Seaforth, Huron.

Woodwork—
H. L. Ingram, Inst. for the Deaf, Belleville.
W. A. Ward, Guelph.
Alex. Moir, London, Ont.
Edward Slaughter, Collingwood.
L. G. Lorriman, Thorold.
D. N. Cornell, Cornwall.
W. F. Darroch, Toronto.
W. T. Ferguson, Smith Falls, Grenville.
F. J. Phelan, Chepstow, Bruce.
D. D. Smith, Cornwall.

Cardboard Work—
L. E. Chambers, Guelph.
W. M. Flumerfelt, Guelph.

Metal Work—
C. T. Yeo, Galt.
T. J. Later, Listowel, Perth.
J. W. Whiddon, Goderich.

Each one was granted a certificate of attendance except Miss Bessie Corbett, Belleville, who left before the end of the Course.

It is gratifying to hear from former students of these classes that the training received is proving of much service to them in their work. And it is a matter of satisfaction to all concerned to learn that the student who applies herself to the work with any degree of earnestness is not only capable of acquiring in this short course a working knowledge of the subject, but is also able to carry it out successfully in practice on returning to her duties is evident from letters received from

time to time from those who have been in attendance. As a testimony to this statement, I take the liberty of inserting here a letter just received from a 1909 student:

"I've just returned from a Manual Training Class held Saturday mornings for the benefit of the teachers who are teaching in the Mental Defective rooms or Ungraded Schools, as they are sometimes called.

"We are taking the woodwork part. It is very, very interesting. We find it so helpful in our work among the boys. The boys love it. I've made tables, pigeon house, chairs, key racks, etc. Just out of packing boxes. I say *I*. I should say the boys, for they did it all under direction.

"I'm so pleased I took the Farm Carpentry. I can make more use of it in a city than in the country. It works in so fine and is so applicable in our work. It lays a good foundation for beginning.

"I'm not afraid of using the tools. We have not made a 'stretcher' and the things that we made at Guelph, because at this time of year we do not need them. But it is the use of the tools and the principles that can make you very resourceful.

"Just get a fretsaw and an orange box and set a boy to work till you can get a work bench. That is what I'm doing just now. We have been working without the equipment in our school. However, we are to have our room equipped *extra* shortly. Some of the schools are beautifully equipped. They are just starting the class in the school I'm in. It is a very large school. There are over one thousand pupils in the primary department. I have the *Special Class, and find it very interesting.*

"I have so much use for everything I learned at Guelph. We have started some pot work. The boys would be delighted to have some dirt to work in—or, I mean, more than we have at present.

"The boys brought their own saws and hammers from home; we had no plane to begin with; the novelty of the work helped them to be resourceful. The tables, which were two feet by two, they carried home at night and returned in the morning, they were so anxious to work on them. The class I have are Mental Defectives (a mixed class). When the girls sew the boys want to sew, too, and do as well as the girls. The girls like to use the tools. A characteristic of that class of pupils is that they all want to do the same thing. In some schools the classes are all boys, in others all girls. I think in time it will be a general thing to have the classes arranged that way.

"I think, too, Medical Inspection is a good thing, because the children will be placed in those classes at an earlier stage, and there will not be so many boys who are too big for the Junior Classes.

"I think, too, that many of them on leaving school under proper supervision would be able to make a living on a piece of land not *too large.*

"You must excuse me for inflicting you with this epistle, but when I get at the work bench and see what can be done for boys in practice, not theory, I feel so glad I've been to Guelph.

"I hope you will be there many years to come.

"A Summer Student of 1908 and 1909,

"Yours truly,

"JANE LUSH."

NORMAL COURSE.

Messrs. J. T. Later, Listowel, and J. W. Whiddon, Goderich, who entered for the Normal Course in Manual Training in September, 1909, completed the course in July, 1910. Their work having been reported on to the Department of Education, they were granted a certificate qualifying them to teach Manual Training. They also received the College's Full Course Certificate. Mr. Later was appointed Manual Training Instructor at the Sault Ste. Marie Technical Institute and Mr. Whiddon to the Collegiate Institute, Port Arthur.

The following students of the Summer School and Saturday morning class have received appointments conditionally on their completing the full course within a prescribed period: Mr. J. E. Chambers, Guelph, to the North Bay Normal School; Mr. W. M. Flumerfelt, Guelph, to the Guelph Public Schools; Mr. Arthur E. Hutton, Vancouver, B.C., to Owen Sound Collegiate Institute; Mr. F. J. Phelan, Spring Course, 1910, and Saturday morning class, to the Consolidated School, Guelph.

Fall Term.

Six candidates entered for the Teachers' Normal Course:

Mr. Chas. Tebbutt, Holmesville, Huron.
Mr. J. T. Powers, Queensville, York.
Mr. Hugh H. Coutts, Waterloo.
Mr. Thos. W. Davidson, Camborne, Northumberland.
Mr. A. Kiernan, Wallbridge, Hastings.
Mr. J. O. Close, Woodstock, Oxford.

Owing to an affection of the eyes, Mr. Coutts was, after a thorough test of his eyes by an optician, advised to give up the course, as his eyes could not possibly bear the strain.

Other students in attendance were:

Farm Mechanics and Metal Work, Second Year Agricultural Students..	91
Color and Household Decoration	57
Woodworking	4

The Second Year students were taken to Niagara Falls to view the working of the Hydro-Electric Plant. At the station we were met by Mr. Jackson, Superintendent of Victoria Park, and his colleague, Mr. Moore. Mr. Jackson had mapped out a programme for the day and had provided for our convenience a motor car and two electric street cars in which we journeyed to Queenston Heights. Here on the lawn at the base of Brock's Monument Mr. Jackson gave a short address on the Hydro-Electric Power. We returned by cars to the power houses and ended a most instructive and enjoyable day in visiting the Shredded Wheat Factory. To these two gentlemen and to the authorities of the Hydro-Electric Power and to the Shredded Wheat Company, we extend our heartiest thanks for their kind attention and generous hospitality.

The contract for installing the ten extra forges with fan and blower in the forge room was given to the Bond Hardware Company, of Guelph, being the lowest tender for the sum of $645.00. These are now in position. The motor was purchased from Jones and Moore, of Toronto, for the sum of $350. An additional appropriation of about $350 will be needed for anvils, tools, and belting.

This additional equipment will greatly facilitate our work with the Second year students and will enable us to make the Forging Course more efficient in character and in usefulness than it was possible to do with the limited accommodation which previously existed.

Donations of farm implements for Machinery Hall have been received from the Smith Cultivator Co., Listowel, 1 cultivator; Canada Ingot Iron Culvert Co., Guelph, 1 length of culvert, 12 ft. x 1 ft. 6 in.; Frost & Wood, Smith's Falls, 1 binder and 1 extra binding attachment, 1 mower; The Spalding Tilling Machine Co., Cleveland, Ohio, 1 two-disc plow.

Presented to the Museum.

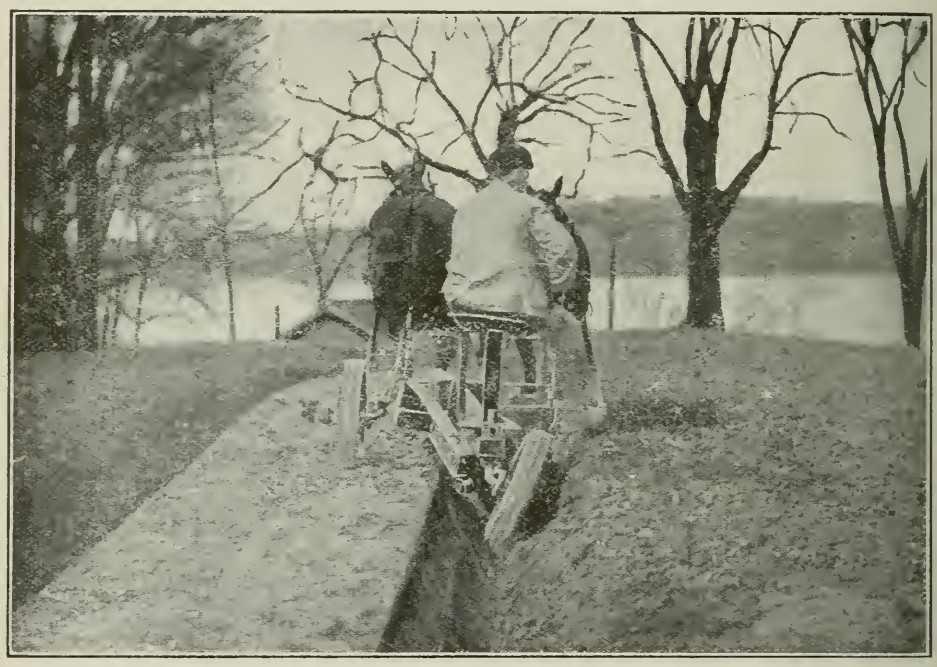
Mr. A. R. G. Smith, Church Hill Farm, New Hamburg, 1 whip saw; Mr. W. A. Wallis, Humber, 1 shovel plow and 1 flax breaker.

By purchase—Part of the collection of Capt. J. G. Spain, Port Dover: 1 old iron shovel, 1 sod cutter, 1 bear trap, 1 circular iron broiler, 1 torch holder, 1 cradle handle, 7 cases of whittling.

The Paris Plow Co., Ltd., Paris, have withdrawn their entire exhibit consisting of 1 No. 3 manure spreader, 1 No. 10 plow, 1 No. 15 plow, 1 No. 21 plow, with skimmer, coulter and wheel, 1 No. 51 riding plow, 1 14″ brush breaker, 1 14″ combination plow, 1 No. 24 high lift gang, and breaker attachments for same.

The Wilkinson Plow Co., Ltd., 1 ditching plow.

Tolton Bros., Guelph, 1 No. 8 steel track car with fork, 1 No. 5 wood track car with miniature slings.



Deep Tilling Retains the Moisture.

Deep Tilling Machine.

In conclusion, I desire to thank those gentlemen who have contributed to our Museum pioneer relics; to the firms named above for the supply of up-to-date implements for the "Hall," and to the firms who have at all times shown us the greatest kindness and consideration when visiting their factories.

I have the honour to be, Sir,

Your obedient servant,

JOHN EVANS.

PART XVIII.

THE PROFESSOR OF FORESTRY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith the report of the Forestry department for the year 1910.

The work of this department during the last year has been largely concerned with the propaganda of reforesting, the co-operative planting and the reclamation of waste land, along with the development of the forest nursery at the Norfolk Forest Station.

During the last season about 200,000 plants were sent out to applicants, consisting largely of Scotch Pine, White Ash, White Elm, Sugar Maple, Soft Maple, Catalpa and Black Locust. A number of planters received Black Walnuts, Butternuts and Shagbark Hickory nuts, to be used in planting in woodlots or plantations.

Fig. 1.—White Pine Plantation on Sandy Hillside, Durham County, made in 1907, through the Co-operative Distribution of the Forestry Department.

Under the direction of the Schools' Section of the Experimental Union, there were distributed 60 collections of forest tree seedlings. These seedlings are used in school gardens or for planting in some suitable place about the school grounds.

For the coming season this department will have for distribution, plants of the following kinds: White Pine, Scotch Pine, White Cedar, Black Walnut, Butternut, Hickory, Sweet Chestnut, Red Oak, Maple, White Ash, Elm and Black Locust.

We have this year a number of hardwoods and nut trees which should prove valuable to those who desire to restock thinned out woodlots. Special Circulars are issued describing more in detail the conditions of the above distribution. These circulars may be had, upon application, from the Forestry Department, O. A. C., Guelph.

Norfolk Forest Station.

One of the chief branches of work claiming the attention of this department is the Forest Station in Norfolk County. The two main features of this Station are experiments in the reclamation of waste land by *forest planting* and *forest nursery* work to produce material for local planting, as well as supplying forest seedlings for general distribution throughout the Province.

The Forest Station in Norfolk County is situated in Walsingham Township, and the nearest railroad and Post Office point is St. Williams, on the Grand Trunk. At present there are 1,300 acres of land in this Station. The nature and condition of this land has been specially described in "Report on the Reforestation of Waste Lands in Southern Ontario," 1908.

Fig. 2.—General View of Evergreen Seed Beds in the Nursery at the Norfolk Forest Station.

Nurseries.

The forest nursery at this Station is located at the border of the poor lands. The soil has been badly depleted, but is being brought back into fertility. At present the depleted condition of the soil and the prevalence of weeds has made good nursery practise difficult, but every year will see an improvement in this respect. In connection with our nursery work we are experimenting with plants best suited for green manures on this light type of soil. The plants used up to the present have been rye, buckwheat, vetch, cow peas, lupins and spurry. This phase of the work should prove of value aside from our own local problem. There is need for a wider knowledge of the uses and value of certain plants as green manures, where agriculture is being pursued on light, sandy soils.

In the forest nursery there are at present about 800,000 forest plants in nursery lines and about 1,500,000 seedlings in seed-beds. The following is an approximate estimate of the nursery stock:

Fig. 3.—Near View of Norway Pine and White Pine Seedlings in Seed Beds in the Nursery at the Norfolk Forest Station.

IN NURSERY LINES.

White Pine, 4 years old	165,000
White Pine, 3 years old	120,000
Scotch Pine, 2 years old	100,000
Scotch Pine, 3 years old	16,000
Jack Pine, 3 years old	5,000
Spruce, 4 years old	30,000
White Cedar, 3 years old	18,000
Black Locust, 1 year old	75,000
Black Walnut, 1 year old	16,000
Butternut, 1 year old	15,000
Hickory, 1 year old	8,000
Sweet Chestnut, 1 year old	31,000
Sweet Chestnut, 2 years old	5,000
Soft Maple, 1 year old	16,000
Elm, 1 year old	10,000
White Ash, 2 years old	10,000
White Ash, 1 year old	18,000
Red Oak, 1 year old	25,000
Tulip, 2 years old	3,000
Catalpa, 1 year old	8,000
Miscellaneous	25,000

IN SEED-BEDS.

White Pine, 1 and 2 years old	1,000,000
Norway Pine, 2 years old	250,000
White Cedar, 1 and 2 years old	200,000
Larch, 1 and 2 years old	75,000
White Spruce, 1 year old	75,000

Fig. 4.—Three-year-old White Pine Transplants in Nursery Lines at Norfolk Forest Station.

Experimental Planting.

During 1909-10 there has been planted some 200,000 plants at this Station. These are chiefly White Pine, Scotch Pine, Jack Pine, Black Locust, Chestnut and Red Oak. These plantings have been largely of an experimental character and should be of great value in any future reclamation work in this Province.

Fig. 5.—Sand Hills planted with Jack and Scotch Pine in Spring of 1910.

The illustrations used will describe this phase of the work better than any written descriptions.

Fig. 6.—Blow Sand planted with Scotch Pine in Spring of 1909.

Fig. 6 shows Scotch Pine planted on blowing sand in the spring of 1909. The photo was taken in September, 1910, and shows that the little trees will thrive

where many thought it was useless to plant them. Many of the plants grew from 12 to 15 inches during 1910 and about 95 per cent. of the trees in this plantation are alive and growing.

Woodland Conditions in Older Ontario.

The improvement of Woodland conditions in the old settled parts of Ontario is a problem which confronts this department.

The following table, showing percentages of woodland and slash land, is taken from the Bureau of Industries Report for 1908. The counties included in this table are those which comprise the south-western portion of Ontario or that part lying south and west of the proposed Trent Valley Canal.

Counties.	Acres of assessed land.	Acres of woodland.	Acres of slash land.	Per cent. of woodland.	Per cent. of slash land.
Brant	215,928	12,057	14,514	5.58	6.72
Bruce	926,964	140,260	97,163	15.13	10.48
Dufferin	357,085	32,161	27,608	9.00	7.73
Durham	371,971	32,982	6,233	8.86	1.12
Elgin	436,440	58,135	21,705	11.03	4.97
Essex	426,483	47,722	45,470	11.19	10.66
Grey	1,069,107	135,566	64,538	12.67	6.04
Haldimand	281,424	34,882	7,530	12.39	2.68
Halton	223,828	20,250	28,169	9.05	12.58
Huron	798,393	59,175	30,240	7.41	3.82
Kent	567,745	48,104	40,983	8.50	7.22
Lambton	659,415	73,785	102,802	11.19	15.59
Lincoln	191,395	17,161	8,692	8.97	4.54
Middlesex	757,615	82,105	12,595	10,81	1.66
Norfolk	398,088	69,070	29,399	17.36	7.38
Northumberland	436,797	42,849	21,126	9.80	4.84
Ontario	504,401	28,712	41,913	5.69	8.30
Oxford	471,267	36,845	16,886	8.24	3.58
Peel	288,569	10,319	5,464	3.57	1.89
Perth	518,693	38,245	27,185	7.37	5.24
Prince Edward	231,894	18,516	3,543	7.99	1.53
Simcoe	967,669	117,504	145,292	12.14	15.01
Waterloo	307,512	32,078	5,622	10.43	1.83
Welland	228,890	19,794	12,722	8.65	5.69
Wellington	628,575	34,682	26,617	5,51	4,23
Wentworth	270,520	16,783	12,954	6.20	4.79
York	537,260	36,701	17,235	6.83	3.20

From this table we learn that this part of Ontario has about 9 1-3 per cent. of woodland and 6 per cent. of slash land. This 9 1-3 per cent. of woodland is largely of inferior quality, having been culled of the more valuable hardwoods. It is not likely that the destruction of this original forest will cease, for considerable of it is on good agricultural soil. The chief hope is that the non-agricultural soils will gradually be returned to forest.

Respectfully submitted,

E. J. ZAVITZ.

PART XIX.

THE PROFESSOR OF NATURE STUDY.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to present herewith the report of the Nature Study Department for the year 1910, this being the seventh annual report of the Department and the sixth which I have made.

The work undertaken and carried out during the year repeats in a large measure the work of the previous year. There have been extensions and expansions necessarily, but these have been along previously developed lines in teacher-training, nature study correspondence, and extension work in gardening with the schools. And as some of our aims and methods in these interests were fully set forth in last year's report, it will not be necessary to repeat them here.

A survey of the work being done throughout the Province by teachers who are co-operating with us in the introduction of agricultural education into the public schools should prove of interest and also of practical use at this time when the problem of adapting the work of instruction in the public schools towards vocational or industrial ends, is engaging so much of the attention of educationists.

As this survey is likely to be of the most interest and use to teachers, trustees and school inspectors, I would respectfully recommend that separate prints be made of this part of the College Annual Report for distribution amongst these. In our opinion this printing and distributing of it as a "separate" would likely lead to a wider recognition of the College's practical interest in the problems of public school education, than if the information were distributed only through the College Report.

TEACHER TRAINING.

Perhaps the most important side of our work is that of the training of teachers. In this, the year is marked with progress; not so much in larger numbers in classes as in the evidences from school inspectors and school trustees that teachers trained here are considered to be specially fitted for the work of instruction in rural schools. Moreover, our work is finding justification in its adoption in many outside places, where the problem of the rural school is recognized to lie in a teaching body specially instructed in the life interests of its clientele. The day is not far distant when rural school teachers in general will not be considered fully qualified until they partake of some share of the instruction which Agricultural Colleges have up to recent times given only to farmers and farmers' sons.

TEACHERS' NORMAL CLASS.

The second Normal Class entered for the course in Elementary Agriculture and Horticulture on April 21st and continued in session for ten weeks. The class was composed of forty-one teachers and one special student. This was not as large a class as that of the previous year, due partly to the keen demand for these experienced teachers by school boards, and partly because an agreement to teach three years in Ontario schools was required. As in the previous class they were all female teachers. All parts of the Province were represented, ten entering from the London Normal, seven from Hamilton, four from Stratford, five from Toronto, six from Peterborough and nine from Ottawa. Their names and home addresses were as follows: 1, Armstrong, Margaret, Brockville; 2, Baker, Mabel C., St. Thomas; 3, Binnie, Bella, Bunessan, Grey Co.; 4, Black, Alice M., Heathcote, Grey

Teachers' Normal Classes, Spring Term, 1910.

Co.; 5, Calvert, Lula, Moffat, Halton Co.; 6, Cornforth, Winona, St. Thomas; 7, Cronin, Loretta, Forest; 8, Dillon, M. Annie, Peterborough; 9, Duncan, Lottie, Keady, Grey Co.; 10, Faris, Jean A., Bradford; 11, Fisher, P. A., Dundas; 12, Flett, Luella C., Embro, Oxford Co.; Goldring, Ida G., Port Whitby, Ontario Co.; 14, Gove, Annie, Smithville, Lincoln Co.; 15, Hendershot, Minnie M., Elfrida, Wentworth Co.; 16, Hope, Ethel M., Summerstown, Glengarry Co.; 17, Jackson, Carrie E., Ventnor, Grenville Co.; 18, Jordan, Lillian G., Lindsay; 19, Lalonde, Katy M., Cobden, Renfrew Co.; 20, McCullough, Susie, Wellington, P. Edward Co.; 21, McIntosh, Katharine, Holyrood, Bruce Co.; 22, McLeish, J. Isabel, London; 23, MacPherson, Tena, Ailsa Craig, Middlesex Co.; 24, Marjerrison, L. Violet, Apple Hill, Glengarry Co.; 25, Melburn, Myrtle, Belleville; 26, Melvin, Mae, Trowbridge, Perth Co.; 27, Nattress, Florence E., Bolton, Peel Co.; 28, Ripley, Alberta, Thamesville, Kent Co.; 29, Rundle, Elsie S., Tyrone, Durham Co.; 30, Smith, Hazel, Fairground, Norfolk Co.; 31, Steen, Laura, Morrisburg; 32, Stenton, Edith, Hull, Kent Co.; 33, Taylor, M. F., Dundas; 34, Thompson, Margaret J., Orillia; 35, Thompson, Charlotte, Strathroy; 36, Woodlan, Myrtle, Smithville, Lincoln Co.; 37, Wright, Caroline, Aylmer (West); 38, Murray, Tessie V., Kenmore, Carleton Co.; 39, Miller, Jessie A., Rock Springs, Leeds Co.; 40, Doolan, Lizzie, Athens, Leeds Co.; 41, Davidson, Annie C., St. Catharines; 42, Lyon, Mrs. J. G., Guelph.

The course covered by this class was practically the same as that taken by the class of 1909 and outlined in Circular 13½, issued by the Department of Education. Every department dealing with the subject of Agriculture at large shared in the work of instruction, and due acknowledgement must be made of the generous support received from the College staff in this connection. While it entailed extra preparation and work, immediately after the close of a busy year's work with our boys, their services were given with readiness and enthusiasm and in a belief that the dissemination of agricultural knowledge through trained teachers must help in a betterment of our people at large.

As in the previous year, the teachers took possession of the boys' residence. The ability of the College to turn itself in a few days' interval from a boys' school into a girls' school—from a school to train farmers into a school to train teachers—speaks well, I think, for its ready adaptability.

All the members of the class were successful in obtaining the certificate in *Elementary Agriculture and Horticulture,* issued by the Department of Education. With this credential they are entitled to a special grant of $30.00 a year, when they carry on successful School Gardening at their schools.

Summer School.

The attendance at the Summer School in July showed a marked increase. In all one hundred and twenty teachers attended and of these ten took the second year course in Elementary Agriculture and Horticulture, and fifty the course in Nature Study. The amount of work covered in these courses is always a source of surprise to everyone; but as it has large recreative features in that school is held outdoors and concerned largely with practical affairs, the work is seldom felt as burdensome. Besides the quality of the pupils is of the highest; the teachers entering for the work come from the most progressive and ambitious in the profession.

It is the intention of several who took the Nature Study course to return next year to complete the work. Others plan to enter for work in Art, Domestic Science or Manual Training. That the work of the Summer School suits the needs of

our teachers is witnessed in the fact that ten of this year's class were taking their third term and seventeen were back for their second summer. Everyone agrees that it is an ideal holiday for a teacher desirous of improvement.

If a summer course means work for the students, it means the same for our teachers. In the work in Nature Study and Agriculture it is impossible to put all the instruction into the hands of a few, as there are so many specialized branches to be treated. This is shown in the list of those who shared in the work last summer: School Gardening, Mr. E. A. Howes; Plant Studies, Mr. J. W. Eastham; Plant Propagation, Mr. Wm. Hunt; Landscape Gardening, Prof. Hutt; Fruits and Vegetables, Prof. Crow; Dairying, Prof. H. H. Dean and Miss L. Rose; Farm Animals, Prof. R. W. Wade and Prof. G. E. Day; Poultry, Prof. Graham; Physics, Mr. R. R. Graham; Chemistry, Prof. R. Harcourt; Bacteriology, Mr. D. Jones; Field Husbandry, Prof. C. A. Zavitz and Mr. W. Squirrell; Insect Studies, Dr. Bethune and Prof. T. D. Jarvis; Stars, Miss M. Moffat; Methods, etc.; Prof. S. B. McCready, *Director*.

Summer School Class, 1910.

It would appear that many of our teachers hesitate to give up part of their holidays for summer school work, fearing exhaustion from overwork. From those who do come, however, there is no lack of evidence that such fears are groundless. While much work is accomplished it is not exhausting, but on the contrary recuperative; Summer school courses are the best pedagogic cures for stagnation and professional exhaustion. The intercourse with other growing minds in the student body is no less wholesome than the instructions of the class room in the newer branches of study. It will be a good day for education in our country when there is a general sentiment in favour of the school-master being put to school himself and kept at school so long as there are new things in the world to be learned. The school-master should never have his trade "learned"!

In this connection the unsolicited testimony of a few of our students might be quoted. One teacher writes:—

"I may say that since spending those four weeks of my holidays at the O. A. C., I have every reason to think that they were very profitable weeks to me. . . . I now have a greater interest in the work than what I hitherto had, and my pupils also have a great interest. Now my pupils will run into the school to ask me out to tell them the name of some bird which they see and do not know. In September and October they showed their keen interest in the study of weeds, and frequently brought specimens to me which had not been in our school garden and thus were overlooked. . . .

"The little Sweet William plants which I brought from Guelph grew rapidly under the eastern air and sunshine, and will possibly be a bright spot in my school grounds to remind me of the O. A. C. Some of the Geranium slips blossomed the other day also. . . .

"I am looking forward to the next summer's course with pleasure."—Carleton Co.

In a Class Observation Book used by students to record matter of special interest, one teacher left this:

"I have been experimenting in summer vacations for the last ten years, and have at last found a summer programme which fills the bill perfectly—a course at the O. A. C."

And another says:

"Most have two objects in living: first, to make a *living;* second, to live a *life.* All must do the first or die. Many succeed but indifferently at the second; others attempt and are rewarded by unlooked-for success.

"In my experience, no course, university or otherwise, has so fitted me to live a *life*, the fullest and most truly enjoyable *life*, as the course for teachers at the Macdonald Institute."—July 28, 1910.

The members of the class in Elementary Agriculture and Horticulture were: Miss L. Clyde, Chatham; M. A. Eberhardt, St. Catharines; M. M. Reid, Erin; N. A. M. Banting, L. A. Fawcett, E. Fuller, A. A. Malcolm, M. D. Moffatt, M. Robb and E. G. Winn, Toronto.

The Nature Study class was made up of: Misses E M. Allingham, Corunna; M. Argue, Stittsville; R. Black, Trenton; L. Carrow, Brantford; M. E. Dark, Brussels; M. C. Davidson, H. Fee and E. M. McCalla, St. Catharines; M. E. Davies, Adrian, Elgin Co.; A. Delamore, Newcastle; M. L. Farquharson, Chatham; N. M. Fenton, Hamilton; M. M. Fox, Smithville; H. Freebey, Maryland, U. S.; A. C. Hare, Aylmer West; E. Hicks, Belleville; A. L. and A. V. Heuston, Thorndale; M. G. King, Virginia, U.S.; M. I. Klinck, Stouffville; L. V. McEwan, Osnabruck Centre; M. A. Martin, Fergus; I. L. Robertson, Strathroy; E. J. Rogers, Wardsville; V. J. Roschman, Berlin; L. Rush, Cannifton, Hastings Co.; R. A. Tate, Bobcaygeon; M. Truman, Glenarm, Victoria Co.; M. Doherty, Erin; M. Wilson, Huntley, Carleton Co.; E. Lawson, and H. Peck, Streetsville; N. Hansuld, Tavistock; A. V. Beattie, J. E. Calder, E. M. Cook, D. F. Eldon, E. Guillet, M. McIlwain, M. S. Russell, R. Sanders and K. Sturgeon, Toronto; Mrs. K. Mitchell, Brantford; Messrs. G. P. Britton, Colborne; I. Hammond, Elmira; A. J. Kaufman, Kurtzville, Perth Co.; A. R. Merrill, Campbellford; H. W. Watson, Winnipeg; T. Dowler, and R. Ballantyne, Bracebridge.

Teachers taking these two courses and completing a Winter's Reading Course become eligible for the certificate in *Elementary Agriculture and Horticulture.*

The Teachers' Reading Course, 1910-11.—The Course is arranged to suit the requirements for the Certificate; the work supplements the instruction in Nature Study of a first summer course and prepares for the following summer's work in Agriculture.

Teachers are expected to read the books carefully and to synopsize them well enough to enable them to recall the chief points clearly. The synopses are handed in at the commencement of the second session and, after examination, are given back to the owners.

The list of books is made large enough to enable a teacher to select those works which she finds in her experience will be most useful to her in her school Nature Study interests. Six books only are required. Teachers are permitted to substitute any other good standard work bearing on the subject of Agriculture or Horticulture in which they may find a special use and interest. The calendar arranged for the reading is only suggestive; the teachers may read the books in whatever order suits them best.

Through an arrangement made by the Schools' Division of the Experimental Union, these books may be purchased at special rates.

The 1910-11 Reading Course is as follows:—

Nature Study—September and October:—

(1) Silcox and Stevenson's "Modern Nature Study" *and* Dearness's "How to Teach the Nature Study"; *or* (2) Hodge's "Nature Study and Life."

Agricultural Science—November:—

(1) Plumb's "Types and Breeds of Farm Animals," *or* (2) Dean's "Dairying," *or* Robertson's "First Lessons in Poultry Keeping."

Physical Science—December and January:—

(1) King's "Soils," *or* (2) Master's "Plant Life," *or* (3) Dunn's "Weather," *or* (4) Tarr's "Geology," *or* (5) a standard work in Astronomy.

School Gardening, Etc.—February:—

(1) Greene's "Amongst School Gardens," *or* (2) Kern's "Amongst Country Schools."

Horticultural Science—March and April:—

(1) Rexford's "Flowers and How to Grow Them," *or* (2) Bailey's "Principles of Fruit Growing," *or* (3) Green's "Vegetable Gardening."

Biological Science—May and June:—

(1) Bailey & Coleman's "Biology," *or* (2) Conn's "Bacteria, Yeasts and Moulds in the Home."

CERTIFICATE IN ELEMENTARY AGRICULTURE AND HORTICULTURE.

ONTARIO
DEPARTMENT OF EDUCATION

Elementary Agriculture and Horticulture

This is to Certify that Miss L. E. Patmore

having attended the special session of the Ontario Agricultural College, Guelph, from April 19 to June 29 1909, and having passed the examinations prescribed by the Department of Education, has been awarded a certificate in Elementary Agriculture and Horticulture, valid during good behaviour.

Dated at Toronto this 30 day of July 1909.

Registered Number 55

R. A. Pyne Minister of Education

R. W. Anglin, M.A. Registrar

John Seath Superintendent of Education

Form 67—200—July 1909

Up to this date the following have been granted the certificate for work in our summer schools:—Miss Lavina Clyde, Chatham; Miss M. A. Eberhardt, St. Catharines; Miss Louise Waterman, Bensfort; Miss Mabel L. Stewart, St. Catharines; Miss Essie M. Sann, Mountain; Miss Ena Henderson, Underwood; Miss Jane Lush, St. Thomas; John A. MacDonald, Thamesford; D. Arch. MacDonald, Esterhazy, Sask.; Miss Mary M. Reid, Erin.

AN INQUIRY AMONGST NORMAL TEACHERS TRAINED HERE REGARDING THEIR EXPERIENCES IN INTRODUCING AGRICULTURAL INSTRUCTION IN THE RURAL SCHOOLS OF ONTARIO.

In order to learn in how far and in what ways our work in teacher-training is effective, an inquiry was made last June amongst the members of our first Normal Teachers' Class. With a few exceptions these teachers had taken positions in rural schools, and were scattered throughout the Province. They had been away from us for a year and had thus had ample time to put their training to a fair practical test. Excerpts from their replies are given, as their experiences throw so much light on the problem of the improvement of rural education and offer so many suggestions for a most reasonable solution of it.

Teachers' Spring Class, 1909.—Now teaching throughout Ontario.

I did not directly extend the enquiry amongst the trustees and school inspectors concerned. Perhaps this should have been done, in order to see the teacher's work in its proper perspective. Indirectly, however, there is presumptive evidence that the work of teachers trained here is favored. In some cases, inspectors have been successful in securing a number of trustee boards to engage teachers qualified to teach Agriculture through School Gardening. In other cases trustees have directly engaged the teachers for this special service.

It should be remembered that the teachers answering are not novices. Everyone had taught school previous to her attendance at the Normal School. Most of them had taught three years; some had taught five or six. They were representative of our permanent teaching body—so far as we can speak of our teachers being permanent. They were following up teaching as their chosen life's work.

The questions asked referred to the different phases of their work along the lines in which they were trained here—what subjects had been found most adaptable; how far they had been able to introduce school gardens; what encouragement they had received from trustees, parents, pupils and inspectors; what the difficulties of the work had been; what they had found to be the best method of taking up the work in the school; whether their training had helped them in their intercourse with the people of the district in which they taught; what agricultural books were represented in the school libraries; whether there was any change to be marked in the attitude of people in the country towards education, etc.

In general, the conclusion must be reached that the work of the teachers as a whole was acceptable. Most of the teachers are remaining at their schools for another term, and in many cases at increases in salaries. Where teachers have changed to other schools it has been in many cases at an increased salary, and in order to be able to find a more favorable field to take up school garden work under a board of trustees that would support them.

One teacher who was forced on account of her health to give up a heavy country school writes:—

"I was very sorry to have to resign, for several reasons: (1) Because School Gardening could have been successfully carried on there this year; (2) Because the people appreciated work done so much; (3) Because they offered me $650 to stay."

One of the chief drawbacks to our teachers' carrying out instructions in Agriculture lies in the public attitude towards examinations. Education and passing examinations are apparently synonymous terms in a great many places yet. Evidence of this comes from different sources. The teacher quoted, speaks for many teachers throughout the Province.

"To be strictly honest, I must say that neither the pupils nor the parents seemed to have any desire to have Agriculture taught in the school. The one aim of the parents was to have their children pass examinations, and of course Agriculture did not contribute to that end. Furthermore, I had so many classes that I worked faithfully every minute of the time from nine in the morning until four in the afternoon and could never get as much of the actual school work covered as I knew to be necessary in order to have the pupils thoroughly prepared for their examinations."

Replying to the question *"On the whole was your course at Guelph 'worth while' to you as a teacher?"* there is affirmative unanimity with much emphasis.

"Some questions I am asked now, I wouldn't have had the least idea about before going to Guelph."

"I enjoy country life better since being at Guelph."

"The benefit derived from my course is of a deep and lasting nature. My conception of Agriculture is broader, and I think I am able to arouse a deeper interest in farm life in the minds of my pupils."

"My ideas and sympathies have been broadened."

"It certainly was; perhaps because I was so ignorant before."

"Yes, for I knew absolutely nothing about Agriculture and Horticulture before I took the course."

"The course was *certainly* beneficial, as it gave me a new interest in all Nature, which has enabled me to make the subjects more beneficial to P. S. children."

In reply to the enquiry *"In what way has it been of benefit to you in your work or in your coming or going amongst people?"* the following observations have been made:

"It has helped to bring the pupils into closer contact with me as a teacher and awakened a wider interest in the school for both teacher and pupil."

"It has broadened my ideas and taught me to keep my eyes open."

"Have been asked quite frequently to identify weeds found on neighboring farms.'

"It has helped me to see beauty in the common things about me."
"I feel that the school and the farm are on the same level."
"It makes pupils inquisitive concerning the things they see every day."
"I observe things that hitherto were passed unnoticed."
"It has broadened my ideas of Agriculture and given me greater insight and sympathy in farm life."
"I have been better capable of carrying on interesting conversation-lessons, agriculture lessons, etc., with pupils, and in some instances have revealed useful facts to farmers *re* weeds, new crops, etc."
"I find I can become interested in the people more readily because I am interested in and know something of their work."
"It has created an interest among the children in agricultural work, and thus aroused the interest of the parents in the children's work."
"The course made me a more intelligent and sympathetic visitor among the people It increased my real value as a teacher and individual."
"Some people imagine that teachers are good for nothing excepting the three R's. I find I can converse fairly intelligently with our farmers on work which directly interests them. I have been able to identify some of the weeds which the children bring in. I think it gives the teacher greater prestige among the people."
"Enables me to meet people on their own interests."
"It has given me better chances to study the child."
"It has helped me in a better understanding of the people's work; easier for me to converse with them."
"The multiplication of interests in school and out of school seems to result in an increase in the joy of living for pupils and teacher."
"I used to dread teaching lessons on Nature Study. "Now I understand what to take up, and enjoy it very much."
"I get from it many valuable ideas in making clear other subjects of study."
"I have a higher view of Agriculture, and try to have pupils and people take a similar view."
"People who are interested in Agriculture were interested in my work, and they liked it because I took an interest in their work."
"The actual knowledge and the methods of gaining knowledge have been my greatest help."
"I have been able to pass my knowledge on to my pupils, and in coming and going among the farmers of my school section also."
"I think I can better understand their failures and appreciate their successes. The people are glad to know that the College can possibly help children."
"It has been of benefit to me both personally and professionally. I am glad to be able to answer some questions put to me by the people at large, intelligently; much school work is facilitated."
"It promotes a better class feeling and sympathy between teacher and pupil."

Replying to the question as to the desirability and possibility of teaching Agriculture in the schools, practically every teacher declared that it was desirable and the majority thought it possible also. Some considered it could be taught to a limited extent in conjunction with other subjects, in certain localities where sentiment favored it.

"One lesson a week might be allowed for it in a large school, but otherwise it will need to be taken up with other subjects."

Replies to the question "*What part of the course do you consider to have been of most value?*" show great variety. Some subjects which were found to be applicable to school work by some were not used by others. There were some, for example, who profited much by visits to local manufacturing industries, and others who had received little of use in her work as a teacher from such. Evidently the personal interest and adaptability of the teacher determined largely the line of work followed. The interests of the community also largely determined the nature of the work taken up, but in this respect unexpected things were reported; one teacher in a dairying district had not been able to find uses for her instruction in Dairy Husbandry; another in a gardening section had not been able to apply her instruction in Horticulture. In some cases teachers had to report that the burden of the regu-

lar school work, consequent on large attendances, multiplicity of classes and the pressure of examinations, permitted little or no opportunity for taking up the work.

"Nature Study, Entomology, Animal Husbandry and Botany (weeds)) were the ones I liked the best, but I needed every subject that was taken."

"The outside work was of most benefit, and what we had to work out and learn for ourselves."

"I have been able to utilize almost every branch of our study through the teaching of Nature Study."

"The practical work in gardening and the study of plants, weeds, birds and trees. These best awaken a child's interest."

In general the teachers report the work taken in field excursions and in gardening to have been of most value. If there was one subject more often referred to than another, it was the subject of weed studies. This would seem to be a particularly good line to move along in the introduction of agricultural teaching.

The enquiry as to *the method that had been found most satisfactory in taking up the work* showed that the teachers were not using an undue proportion of the school time for the subject and that a definite system with a definite place on the program prevailed generally.

"The best method I found for handling the work was to have the class report observations in the morning or directly after noon. Discussion on these occupied from ten minutes to thirty-five minutes according to the occasion. Incidentally other things were taught when suggested by procured specimens, as—the life-history of the rust on wheat was taught when an affected barberry was brought in."

"Sometimes I give them questions to find answers at home."

"I take tramps in the woods with my pupils after four and on Saturdays."

"I think that giving questions on Nature and Agriculture to be found out at home, and reported on next morning, is best."

"Throughout the year a few minutes after nine o'clock and one o'clock were spent as follows: Reporting observations on (1) plant life, such as weeds, trees and wild flowers; (2) animal life, as insects and birds; (3) on varieties of apples, etc."

"Best method followed was to direct the children and suggest to them, and then have them find out for themselves as far as possible."

In answer to the question *"Have you met with encouragement in bringing the things learned at Guelph into use in your teaching, (1) from your Inspector, (2) from your trustees, (3) from the parents, (4) from the pupils?"* there is diversity of report. Evidently with few exceptions the Inspectors are encouraging teachers to take up the work. Apparently trustees in many cases neither encouraged nor discouraged the teacher, but left it to her to work out as she liked. Parents in general were reported as becoming interested through the children being aroused.

But the teacher's best encouragement came from the pupils. There is a unanimous finding that the children take readily to the study; there would seem to be a natural inclination to it. Many report that the pupils are more interested in it than in any other school subject.

Regarding the desirability of having a Text Book in Agriculture in the schools, the teachers were asked for an opinion. In the majority of cases the opinion was that a text for the teacher's use would be of advantage, but that none was needed for the pupils, especially where reference books were available in the library.

"A text-book in Agriculture would be a help in giving a systematic course, but would have some disadvantages, as the needs of one locality differ somewhat from the needs of another. There might be the danger, too, of teachers who are not specially trained teaching Agriculture from the book and giving a wrong impression of what the teaching of Agriculture by trained teachers should be."

"I think a text-book in Agriculture is highly desirable to supplement the practical work."

"I do not think a text-book necessary if one has taken a course at the O. A. C. Children often do better work and take greater interest in a subject if a text-book is kept out of their hands."

"A text-book in Agriculture is desirable in a fair-sized school where there is time to use it."

"A text-book for teachers might be needed, but it is not necessary for the pupils to have one."

"I think a text-book in Agriculture desirable. People, I think, are beginning to see that education should be more practical and that everyone should have a chance of studying that which they intend pursuing through life."

"I think a text-book in Agriculture would be of great use as a guide to the teacher. There seems to be so much to choose from that it is hard to decide what is of most use and of the greatest importance and interest to the pupils and to the different classes."

"No text-book is needed if the Nature Study method of teaching is followed. If there was a text-book the work would be less interesting."

"Yes, if it is more suggestive than 'hard and fast.'"

"I have not yet felt the need of a text-book when there are reference books in the library. The freedom in Nature Study seems to be one of its greatest advantages."

Agricultural Books in School Libraries.

Inquiry about the books dealing with Agriculture and Horticulture that are represented in the school libraries elicited the information that only a small proportion of the schools represented in the enquiry were provided with such. A number of schools have a fair provision of books dealing with Nature Study and these are apparently used to advantage. Some schools reported ancient copies of Government publications, such as reports of the Fruit Growers' Association or of the Entomological Society. The commonest books were those on weeds and birds, and these are put to good use in most cases.

The use made of the books is largely determined by the teacher. Where she arouses interest in weeds, birds, insects, fruits, crops or farm animals, the pupils soon have desire to use the books. Where the pupils and children use the books, the parents also are awakened to interest in them.

The enquiry emphasizes the desirability of systematically using the school libraries of the country as a medium of bringing our Government publications into a larger and more intelligent use. If the children could be educated—and it could readily be done through an interested body of teachers—to use them, a great economy, industrially and educationally, would be served.

The following answers are selected to show what is being done and what may be done for agricultural education through the library.

"The agricultural works in the library are (1) Physics of Agriculture, (2) Flowers and How to Grow them, (3) Landscape Gardening. Pupils take them home to read, and I also take lessons in school from them."

"I had several agricultural books added to our library, but just within the last term. Dean's 'Canadian Dairying' has been of interest and use."

"We have but few books in our library, but I notice that they have been frequently consulted by pupils to identify weeds or birds."

"We have six works on Agriculture in the school library, but I have not made much use of them in the school, because they are too advanced for young children such as I teach. However, the older people of the section have been reading them, and they may help them."

"The only things resembling agricultural works that we had last year were Bulletins of one kind and another. The pupils seemed much interested in these, and in making comparisons between the reports of different years. Books with pictures were eagerly sought after."

"There are few agricultural books; those we have are more along Nature Study lines. The children enjoy reading these. . . ."

"We had a book on weeds, one on fruit, Hodge's 'Nature Study and Life,' 'Birds, Bees and Sharp Eyes,' and the *O. A. C. Review*. . . . The fourth and fifth classes found them very interesting. I also used them to prepare lessons."

"We have a Bird Book and a Weed Book. They are consulted very frequently in finding names of specimens brought in."

"We have in our library a book on the common weeds, with a colored drawing of each, which we use a great deal."

"We have a number of books dealing with the study of plants, insects, birds and natural history. . . . I encourage the children to read them."

"We have a number of agricultural works in our library, some of which were read very little until we started to take up different branches of Nature Study and the pupils got a desire to find out more for themselves. The parents, as a rule, do not seem interested in these books."

"A book on weeds and a bird book owned by one boy; also other books on birds used considerably by pupils."

"The only volume on farm work we have is Plumb's 'Types and Breeds of Farm Animals.' The older boys and men seem to like it."

"There were no agricultural works in our library excepting one, identifying common farm weeds of Ontario. This was of great value in the spring and fall terms."

School Gardening.

Regarding the question of school gardens many things were reported, showing how difficult it is to introduce such a marked innovation into our school system. The chief drawback would seem to lie in the lack of public sentiment to support the teacher in the undertaking. Trustees at large are uninformed concerning the methods and purposes of it. There is a fear that it will distract from other more legitimate school studies and hinder progress in the essentials.

In many cases the physical conditions prohibit an attempt at the outset. The grounds are unfenced, the soil is clay or gravel or sand or stony or rocky or hilly. Where soil and fence might permit, the grounds are too small or the presence of trees prevents it. The purchase of additional land is not favored, as the permanence of the idea or the teacher advocating it are not assured.

Where the idea and soil might permit, the attendance is too small and the pupils too young; or on the other hand the attendance is too heavy and the other school work sufficient for the strength of one teacher.

Time is necessary in our system to bring about any general adoption of gardening. Several teachers report that there are prospects of commencing one at their schools next year. In many cases teachers have found it impracticable to start one because the school is backward from frequent changes of teachers; one was the eighth teacher in three years. With our teachers fixed more permanently in schools, with better salaries paid, with an increased valuation put on education by people at large, these things will come if in the process of time they substantiate the claims made for them.

Out of the class of ninety-one the following teachers report carrying on garden work. In group A the work is being taken up on a scale entitling the teachers to the special grant of $30.00, and the trustees to a like amount. In group B the work is being carried on on a smaller scale and will not share in the Government grant.

A. Miss Annie M. Boal, S.S. No. 16, N. Dumfries, Waterloo, Glenmorris; Miss Jessie Eakins, S.S. No. 15, Burford, Brant, Fairfield Plains; Miss Laura Fuller, S.S. No. 1, Ellice, Perth, Stratford Miss Maggie G. Hamilton, S.S. No. 12, Windham, Norfolk, Brandy Creek; Miss Jean Schleihauf, S.S. No. 6, Chatham, Kent, Eberts; Miss Gertrude Sprague, S.S. No. 1, Elma, Perth, Trowbridge; Miss Bessie Van Every, S.S. No. 23, Waterloo, Waterloo, Waterloo P.O.; Miss Florence E. Wegenast, S.S. No. 11, Malahide, Elgin, Aylmer (W.); Miss Lily E. Wilson, S.S. No. 4, East Whitby, Oshawa; Miss Ella McLean, S.S. No. 7, Wellesley, Kingwood; Miss Mary Watson, S.S. No. 3 and 10 Plantagenet, Prescott, Pendleton.

B. Miss May S. Cody, S.S. No. 8, Beverley, Wentworth, Ryckman's Corners; Miss Lucy Kenney, S. S. No. 9, Oxford, Kent, Muirkirk; Miss Eleanor Perrott, West Essa, Simcoe, West Essa; Miss Edna M. Root, S.S. No. 1, Augusta, Grenville, Prescott; Miss Elfleda Roy, S. S. No. 6, Downie, Ontario, Avonton; Miss Violet M. Savage, S.S. No 1, Oxford, Kent, Clearville; Miss Edna D. Twiss, S.D. 1744, Flota, Hanson, Sask.; Miss Irene Clark, U.S.S. No. 3, Glanford, Barton and Ancaster, Wentworth, Ryckman's Corners.

Probably as many more of the class are carrying on gardening as part of their school work through children's home gardens. For this there is no special grant allowed. In almost every case work is being done in practical plant studies, in window boxes or flower beds.

Of this work, the teachers participating in it give favorable accounts. And as these teachers are pioneers in the experiment so far as Ontario at large is concerned, a record of their experiences will prove of value to any who may be considering the commencement of the work. Amongst other matters reported on they say this:—

"Our school yard is a rock layer, so in order to have *any* garden, earth had to be drawn. Those interested drew twenty-five loads, levelled it and sodded the edges, making a raised bed 2 feet deep, 22 feet long and 16 feet wide. This section is interested in our enterprise, encourage the pupils to help in its care, and fairly deluge the teacher with suggestions and offers of plants."—Wentworth Co.

"The trustees favour the teaching of Agriculture and are determined to have a better garden next year. They have already rented a piece of land in a better situation, and as the pupils and teachers are more enthusiastic than before, everything looks bright for the garden of 1911."—Prescott Co.

"At first it was thought that a school garden would be too much for this school, as there is an average attendance of over forty; but since we started the work and the other school studies are not neglected, the people are beginning to like the garden. At first the Senior Fourth class did not like the garden, as they thought their time fully taken up, but now they like the half-hour daily which they spend in it. All the pupils are taking a great interest in it, and it is a daily sight to see them all busy in it during the noon hour."—Ontario Co.

"The children were proud of their gardens and kept them very well; they were anxious to see the school grounds improved. Many things were destroyed by intruders who opposed the garden and tried to do it harm."

"We are enjoying our garden work here very much. . . . It was really a pleasure and surprise to see the earnestness with which they went to work—they 'dug right in'! . . . The pupils' interest has not abated, and I do not think it will. We work outside part of an afternoon a week, the weather determining the day.

"The garden is 132 feet x 34 feet, surrounded by poultry netting to keep out stray hens. . . . Then we have the four class plots, besides numerous other things, such as barley—O. A. C. No. 21—clovers and other legumes, sorghum, broom corn, different kinds of fodder corn, all of which we received from the College (i.e., the Schools Division of the Experimental Union)."

"Our plots are 10 feet x 4 feet, staked out and labelled; the paths are 1½ feet, but next time I would have them wider.

"We made Garden Journals—some really fine work! In them we keep garden notes and have part of each one for observations outside of the garden. It seems to stimulate them to see things."—Perth Co.

"The trustees were much interested and the parents generally in favor of it. The children found recreation in attending to their gardens at noon and recess."—Simcoe Co.

"The trustees were enthusiastic from the first, and the Inspector also. The parents very enthusiastic now. . . . Better discipline apparently follows work on or in the garden. . . . I shall always try to have the soil well worked up in the fall ready for spring work, and fight— FIGHT against weeds. . . . Many teachers, I am sure, would become interested in the work were they not afraid to start it; fear of failure holds many of them back."—Waterloo Co.

"We had a trustee meeting to get the support of the trustees. The ground was marked off and the pupils spaded half of it; the janitor spaded the rest. A neighbor gave us the fertilizer. We borrowed hoes, rakes and spades. Pupils brought stakes to mark off the plots. Each child started a Garden Journal. The parents seemed pleased with the work. The children were delighted with it and told everybody about their

gardens at school. They found out that 'Unity is strength.' The work did not interfere with the regular work, but aided in making it vivid."—Kent Co.

"After the garden had been worked ready for planting we had the third-class boys do the measuring and staking. . . . These boys I find to be the best workers and the most interested in the garden throughout the term. . . . A few minutes each day, generally before the afternoon recess or before four o'clock, was allowed for the garden work until after the sowing was done, when a great deal less time was required. The older pupils were allowed to supervise the work of the little ones.

"The parents became interested, as they saw how interested the children were, so that now I do not know of anyone in the section who would object to having the garden another year.

"The trustees were anxious to have the garden a success, and did all they could to help.

"The children could not have been more interested —even those who had no plots were anxious to help in the work. The interest in the other school work increased through being connected with the garden.

"I found the greatest value in connecting the home and the school work and in providing material for Nature Study lessons.

"On October 14th we had a fair at the school, in which the children were very much interested."—Brant Co.

"In a school where the work was commenced with a few observation plots one trustee said: 'I wish now that we had a larger school garden.'"—Wentworth Co.

Weaknesses and Their Remedies.

The enquiry has shown many weaknesses in our cause. Not that there is no need for pushing for the teaching of Agriculture in the rural schools! As time goes on there is greater and greater need for it; The inadequacy of the teaching force is the chief lack. In two years we have trained one hundred and thirty teachers for the service; this is scarcely a handful for the five thousand schools that might profitably use them. With the shrinkage that comes from teachers leaving the country schools to take positions in the towns and cities and from their retiring to take up other lines of work, little advance can be made if other means are not found to meet the situation.

The isolation of the teacher is another hindrance. The teacher in the one-teacher rural school is one of the most isolated workers in the world's workshop. Surrounded often by influences that retard, seeing her inspector only twice a year, cut off from her fellow workers, left without any direct means of communication with the educational authorities and ignorant of the progress of education in the world at large, it is hard to expect any strong widespread effect from a few girls scattered here and there throughout the schools of the Province.

The lack of widespread moral support is felt too. Teachers would do more for the cause if the people at large understood the meaning and purpose of education aright and gave their teachers their support in advancing along new lines. Without this support, a teacher, however progressive she may be, must in a large measure follow the well beaten tracks. She cannot make her environment; she is the victim of it.

To overcome these weaknesses, great changes will have to be brought about. To supply an adequate number of qualified teachers, not only must the work of the College be extended in its Normal and Summer Courses, but Agriculture will need to be taught in all the Normal and Model Schools. To bring the one-roomed rural school out of its isolation, the question of consolidating schools must be considered on a large scale for the Province. To enhance popular sentiment in favour of education, a strong propaganda is called for from all the educational forces in the country.

Training of Teachers Elsewhere.

In last year's report I indicated the progress being made in this connection in the United States and Canada at the Agricultural Colleges and Normal Schools; this work is being continued with success. A reference here to the Dolliver-Davis bill now before the Congress of the United States will show the tendency towards industrial education in that country. This proposed federal measure provides for a uniform system of industrial and agricultural education, and is known as a *Vocational Educational Measure.* It does not interfere in any way with the State rights in the matters of education, but seeks to co-operate with the different States "in encouraging instruction in Agriculture, the trades and industries and home economics in secondary schools; in maintaining extension departments in State Colleges and in preparing teachers for these vocational subjects in State Normal Schools and to appropriate money and regulate its expenditure."

It proposes to grant $5,000,000 annually after 1914 for the maintenance of this work in all secondary schools in the several States and Districts, allotted in proportion to the census of 1910; $4,000,000 annually to the district agricultural schools of secondary grade; $1,000,000 annually for the support of branch experiment stations at the agricultural high schools; $500,000 annually to agricultural colleges in support of extension departments; $1,000,000 annually to State Normal Schools giving instruction in agriculture, trades and industries, and home economics.

Should the bill pass and this large sum of money—$11,500,000 annually—become effective, the United States will make a great step forward in secondary industrial education. As the matter was largely endorsed before, when the bill was before Congress as the Davis Bill, it is expected that it will now pass, in its reshaped Dolliver-Davis form. This participation of the Federal Government in the affairs of education of the Federated States is reflected in Canada in discussions regarding the Dominion Parliament voting money to promote industrial education in the Provinces.

Extension Work.

The work of the *Schools' Division of the Agricultural and Experimental Union,* commenced in 1909, was continued in 1910, with some new features added. It was felt that the response made by teachers, trustees and inspectors in the first year's operations and the favorable reports received warranted us in extending the lines of co-operation between the schools and the College. The past year's results have justified the extra expense and labor. About 250 schools have shared in the distribution of materials.

The following were offered to the schools this year:

(1) Seed Packets for Children's Gardening. These were sold at 2 cents a packet. In most cases they were used by the children in home gardening rather than in school gardens. Eight vegetables and eight flowers were included in the selection, adapting them to the eight public school grades.

With the seeds a circular of instruction was sent out to guide the children and teacher in the practical work. Another circular was specially prepared as a guide to the teacher in taking up lessons in the school based on the work.

About 180 schools have co-operated in the work, these representing more than 300 teachers. Most of the schools are in country districts. Nearly 8,000 children have received the packets.

(2) School Collection of Seeds for Demonstration Plots. This collection included samples of different species of wheats for an agricultural plot;

tree seeds, such as walnut, hickory, maple, chestnut and butternut for a forestry plot; onion seed for a vegetable plot and nasturtium seed for a flower plot. These different plots were for the four classes of the schools and intended to furnish material for definite lessons in practical nature study.

Forty-four schools received this collection.

(3) School Collection of Forest Tree Seedlings. The material in this collection was sent out from the Government Forest Nursery in Norfolk County. It consisted of 12 White Pine seedlings (2 year stock), 12 Scotch Pine (2 year stock), 12 Norway Spruce (3 or 4 years), 12 White Cedar (2 years), with a miscellaneous addition of deciduous tree seedlings.

It was stipulated that they might be distributed to the pupils, if they were not required for the school grounds, after they had served an educational purpose at the school for at least one year. In connection with this an offer was made to School Boards to provide material for reforesting any waste land connected with the school and which could be controlled permanently for educational purposes. Although a few trustees corresponded in the matter, no school took up the work; this line of work with the schools offers a good field for inculcating reforesting sentiments and practices.

58 schools received these collections.

(4) School Collections of Fall Wheats. These were sent out in September at school reopening. They were samples of the best varieties of Winter Wheats tested on the College plots and choice selected grain only was sent. Teachers were advised to sow a sample of the best local variety with them as a comparison. Through such distributions there lie great possibilities for improving the quality of the seed grown on Ontario farms.

10 schools received these collections.

(5) Picture of the Ontario Agricultural College. This is a picture 12 inches by 18 inches, showing views of the College buildings, fields, class work, etc. It was sent to schools on condition that it be framed and given a place on the school walls. A presentation card was sent with it, to show when and under what circumstances the picture came into the school. An instruction sheet for the teacher was sent with it also, outlining lessons based on the picture that might be taken up with the pupils.

80 schools were provided with the picture.

(6) The Schools' and Teachers' Bulletins. These four-page monthly reprints from the College paper were included in the offerings, as through these we seek to keep teachers informed as to advances in the teaching of domestic science, manual training and elementary agriculture. On account of not being allowed franking privilege in the mails for the publication, a charge of ten cents had to be made to cover the cost of postage.

About 100 teachers are receiving this.

(7) The O. A. C. Review for School Libraries. We aim to have the College paper used as a link between the country school and the College. Through its presence in the school library teachers, pupils and parents may be led to see the desirability of a higher education for the modern farmer than that which may be provided in the local school. A great many inspectors are in sympathy with this aim and are giving their support to its accomplishment.

About 100 schools are on the subscription lists.

(8) School Collection of Agricultural Seeds. This was sold at 25 cents. It included samples of different kinds of field crops, such as wheats, corns, clovers and legumes, grasses, flax, buckwheat, etc. The intention was to have

schools provided with small plots on the school grounds that would furnish material for practical studies on growth, flowering, seeding, etc. A number of town schools accepted the offer and have made good use of the material.

About 45 schools were provided with the collection.

(9) School Collection of Tree Seeds. This collection contained a larger and more varied supply of seeds than the collection included in number 2. It included oaks, maples, fruit tree seeds, hickories, walnuts, horse chestnut, sweet chestnut, etc. The growing of trees from seeds is one of the most interesting lines of garden studies that schools can undertake. It has a great practical value, too, in the problem of reforesting. A charge of 25 cents was made for the collection.

17 schools were supplied with these.

(10) School Collection of Tulip Bulbs. These were furnished to schools for $1.50. The object was to encourage the improvement of school grounds by the planting of a tulip bed. A circular of direction for planting, with a suggested design for the bed, was sent to the teacher. There were 125 bulbs in the collection, including 50 red, 50 yellow and 20 white.

11 schools sent orders for these.

(11) Weed Seed Collection. This collection was sold for 25 cents. The seeds included in it represented those covered in the Seed Control Act of 1905, the sale of which is restricted in seed grain, clover, etc., as well as some of the more common weed seeds found as common impurities. These collections have been put up specially by the Botanical Department for educational purposes. Teachers have found them useful for reference.

28 schools purchased these.

(12) School Collection of Hardy Climbers. This collection, like the tulip bulbs, was arranged to help in improving school grounds throughout the country. It included four Virginia Creepers, two Hardy Climbing Roses and one shrub Hydrangea. The Virginia Creepers were intended for covering unsightly fences or outbuildings and the roses for adorning the walls.

37 schools secur d these.

While it must be acknowledged that only a very small fraction of the 10,000 teachers and the 450,000 pupils in our schools are reached in this extension work so far, it seems to promise a larger adoption in the years to come. Even though our efforts fail to bring the large proportion of teachers into active co-operation with us, through the work done by the few an impelling change may be effected in a few years in the schools of the Province at large. Certainly a large field lies before us to be worked—all the teachers and all the pupils in the schools! To join these with the College in making for better agriculture and better living is an undertaking to engage one's imagination and efforts!

Respectfully submitted ,

S. B. McCREADY.

PART XX

THE LECTURER IN APICULTURE.

To the President of the Ontario Agricultural College:

SIR,—It is with some satisfaction that I present the second annual report on the work of the Department of Apiculture. Various conditions indicate marked progress in this department. The students are decidedly interested. Like the general public, most of them came here with no knowledge that beekeeping is a business worth considering; but a few facts with reference to other men's success caused them to take notice. Early in the term several became anxious for practical work in this department. Soon an Apiculture Club was organized with about fifty members. By the time the Christmas Examination came the class as a whole had obtained a grasp of the habits and management of bees which was good, considering the limited amount of time and practical work it was possible to give them.

Beekeepers throughout the province are finding out that we are here and writing in for all kinds of information which we are pleased to give. Numbers of beekeepers took advantage of the June Excursions and Winter Fair to call at my office and ask questions. Requests have come from different county beekeepers' associations for lectures and apiary demonstrations. All of which we are pleased to grant, as far as possible. Special interest is shown in the Co-operative Experiment on Swarm Control sent out under the Experimental Union.

COLLEGE LECTURES.

The lecture course was the same as last year—25 lectures to the First Year in the Fall term. The work covered was practically the same as last year.

I attribute the increased interest in the lectures partly to the completeness of the text-book,—"Langstroth on the Honey-Bee, Revised by Dadant," published by Dadant & Sons, Hamilton, Ill.—partly to a set of lantern slides, and partly to demonstrations with a hive of live bees in the lecture room. The chief difficulty experienced was the uncomfortable condition of the lecture room, there being sometimes seventy-five men in the room with only seventy seats and very poor light and no ventilation.

Last year's lack of apiary and equipment has been partially overcome by the removal last spring of twenty hives of bees from the apiary we have at the Jordan Harbor Horticultural Experiment Station to the College. Some new hives and machinery were bought. No Apiculture building has been erected, but the headquarters of this department is located for the present in the Macdonald Institute building, with an office at the back of the Nature Study Class Room, a laboratory in the basement, and the apiary in the grounds at the rear of the building. Both the College Apiary and the one at Jordan Harbor will be increased to full size and used for experimental and practical work. These will be of special value in giving practical work during the summer to some students who are specializing in Apiculture.

Conventions.

There was an even greater demand for addresses at county conventions than last year. After declining some invitations from lack of time, I was able to attend conventions in the following counties: Norfolk, Haldimand, Middlesex, Glengarry, Simcoe, York and Victoria. The subjects taken up were the following: "The Diseases of Bees and how to Treat Them," "Co-operative Experiments in Beekeeping," "The Control of Swarming," "Bees on the Farm," "Local Apiary Demonstrations." There is a strong movement on foot by County Associations to use the annual grant from the Provincial Association for Township Apiary Demonstrations in June, in preference to presenting each member with a subscription to the bee journal, a queen bee, or other premium.

At the annual Convention of the Ontario Beekeepers' Association held in Toronto in November, I presented the "Consolidated Report of the Season's Inspection of Apiaries in Ontario," and also gave addresses on "Rendering Beeswax from Cappings," and "The Great Exhibitions and the Beekeeper." The latter was illustrated by a demonstration with live bees.

Demonstrations with Live Bees.

During the June excursions to the College a hive of bees was placed in a small enclosure of wire screen and used for demonstrating with live bees. This work was repeated at the National Exhibition and at the Western Fair continuously for three weeks. The interest taken by the public in these demonstrations was great. Crowds began to gather whenever they saw the demonstrator preparing to enter the cage. People came back again and again and brought their friends to see and hear about the bees. At the Western Fair, where the other attractions were not so great, people crowded about the cage as far out as they were able to see or hear anything. Children came from school with their note books for Nature Study lessons, and people gathered in little knots asking what hour the next demonstration would be. It is part of my plan to train men to do this work at local Fall Fairs in different parts of Ontario next year.

Advertising.

These Exhibition Demonstrations come under the head of advertising, not only of the honey industry, but of the Ontario Agricultural College. Large painted signs are displayed, showing that it is the Apiculture Department of the Ontario Agricultural College which is represented.

Advertising a product affects two classes of people. First, those who are to be the consumers; second, others who produce the same article. The prospective consumer is shown attractive samples of the article, also some of the processes of its production. In the present case it is a colony of bees in a regular working hive fitted for the production of extracted honey or comb honey. The bees are handled by an expert in a familiar manner which causes amazement and consternation to the uninitiated. While attention is drawn to the bees, the lecturer explains something of their life-history and habits, how they live together in one peaceful family of several thousand sisters and a few brothers—all children of the same parents, how they build their comb, how they gather their honey and carry it to the comb, how the honey is taken out of the comb by means of the centrifugal extractor, how the same combs are returned to the hive to be refilled year after year.

These and many other interesting points of information with reference to honey production enlighten the prospective consumers and answer many of the questions which arise in their minds.

These demonstration lectures are also an education to the many men and women who have a few hives of bees but are not giving them proper attention. There is room for valuable work to be done by competent persons at all the Fall Fairs right along this line in such matters as the treatment of disease, the proper ripening and handling of honey, the proper method of selling honey, and the necessity of realising its real market value. All these points in which the small beekeeper has such a direct influence on the business of the specialist, could be handled in daily lectures at the Fall Fairs and Exhibitions.

While this is going on many questions are asked with reference to the College and the different courses. Quantities of circulars, bulletins and literature of all kinds are carried home for more careful perusal. Naturally the association of the lecture and demonstration makes these far more interesting than though they had come through the mail without any personal touch. As a result some boys and girls will give their fathers no rest until the old apiary is turned over to them to renovate and put on a paying basis. The outcome will often be a Short Course or Full Course at the Ontario Agricultural College, and an added impulse to the honey industry.

Publications.

During the year I have prepared for publication a bulletin on "The Diseases of Bees in Ontario" for the use of Apiary Inspectors in their work, Bulletin 182.—"Beekeeping in Ontario," issued under the Fruit Branch. "The Control of Swarming,"—a circular of careful instructions on this important matter for the direction of experimenters in this branch of the Experimental Union, "A consolidated Report on the Inspection of Apiaries in Ontario for 1910," published in the Annual Report of the Ontario Beekeepers' Association, besides other convention addresses, and articles which were published in the leading Agricultural journals.

Correspondence.

Under all the branches of my work the correspondence has grown tremendously during the past year.

Practical and Experimental Work.

The apiaries were used principally for practical work, for the students. Owing to pressure of other work and lack of trained office help, I was unable to do much experimenting. The Jordan Harbor apiary increased from 18 colonies to 25 colonies and yielded 1,000 pounds of honey; the College apiary increased from 25 colonies to 34 colonies, and yielded 600 pounds of honey. A number of new combs were built in each apiary. Large revenue returns are not to be expected from apiaries used for experimenting and student training.

The bees were managed entirely for extracted honey. For winter they were fed upon sugar syrup, made in the proportion of 50 pounds of best granulated sugar to 20 pounds of water, and 3 teaspoonfuls of tartaric acid. The water was brought to a boil by the application of steam heat, the sugar was poured in and stirred until thoroughly dissolved, the tartaric acid, previously dissolved in a little water, was then stirred into the syrup and the whole was brought to a good boil.

Packing cases were made for out-door wintering to hold four hives, two facing east and two west. Four inches of planer shavings were put in the sides and bottom and 6 inches in the top, the whole being well packed. The winter flight of bees is provided for by means of tunnels from the entrances of the hives through the packing to openings in the sides of the boxes. The roofs of the boxes are covered with prepared roofing. These boxes are made in sections hooked together at the corners so they can be taken down and stored away in a shed for the summer.

The Control of Swarming.

In order to put beekeeping on the business basis it deserves, bees must be brought under the same direct control as other live-stock. Their most difficult propensity to control is the swarming impulse. Yet this must be mastered to insure success. Natural swarming incurs far too much loss of time, bees and honey, to be profitable. Some have mastered the problem, and it is to help others who are struggling with it that instructions for conducting an experiment in the control of swarming were sent out.

Co-operative Experiments.

Under the auspices of the Agricultural and Experimental Union, application blanks were sent early in the spring to our mailing list of beekeepers, and three hundred and fifty applications for an experiment in the control of swarming were sent in from all over Ontario. A circular of instructions was sent to each of these, with a blank form for reporting the summer's work. The season was unfavorable for the experiment, as there was very little natural swarming impulse in most sections of the Province. Some beekeepers also had not suitable appliances, and for that and other reasons were unable to try the experiment, but nearly all expressed a desire to test it next year, when they would be better prepared. In spite of all these difficulties, sixty-five reports were sent in. These show in most cases a fair degree of success with the experiment. They will be fully reported in the Annual Report of the Agricultural and Experimental Union.

Status of Beekeeping.

Under this head might be classed the work done in gathering statistics of beekeeping in Ontario, and arranging them in the card index and mailing list, also the spring report and the two summer crop reports.

The Card Index and Mailing List.

This consists of a card for each beekeeper whose name we can secure. On this card is placed what information we have about him: The number of colonies he has, how he winters his bees, what style of hive he uses, the race of bees he has, reports of the inspection of his apiary, etc. These cards are filed according to counties and townships, and are the source of much valuable information on the status of beekeeping in any or all parts of Ontario. The names and addresses are valuable as a mailing list for bulletins and publications of all kinds, also for local organizing work. There are about four thousand names of beekeepers now on the list, and it is steadily growing. The names come to us in various ways. Reports of inspection bring the greatest number, spring reports bring a lot more, and the regular correspondence adds to the list daily.

Spring Crop Report.

On May 15th, 1910, report blanks were sent to two thousand one hundred and seventy-five beekeepers in Ontario, asking questions concerning local soil and drainage conditions and bee pasturage; also the number of colonies kept, style of hive, and race of bees; methods of wintering and success in the present season, how many years a beekeeper and chief difficulties encountered. The number of replies was twenty-two per cent. of the number of blanks sent. This indifference will to a certain extent be overcome by a careful revision of our list, and by seeing that everyone receives a copy of the summarized report when published. The counties which have local associations almost invariably sent the most and best reports, showing the value of these organizations in arousing the indifferent bee-keeper. Four hundred and eighty-eight beekeepers sent replies, reporting 16,729 hives of bees. Calculating from this we may safely estimate 100,000 hives of bees, kept by 5,000 men and women in Ontario. From later reports the honey crop is known to have been at least five million pounds, worth at lowest prices half a million dollars. This is not a large crop; it is less than last year by fifty tons.

The report on the races of bees shows far too great a percentage of black or German bees kept in the Province, when we consider the menace of European Foul Brood and their susceptibility to it. The chief difficulties which beekeepers have can be summed up in the two great problems of apiculture—wintering and swarm control. As one man said, his chief difficulty was "to get the old woman to watch for swarms." This states in a nutshell the whole trouble with the bees on many farms.

This report was published fully by the Fruit Branch, Ontario Department of Agriculture, in Bulletin 182, "Beekeeping in Ontario, arranged by Morley Pettit."

The Bee-Disease Situation in Ontario.

The first work to be taken up here was to revise the handbook on "Bee-Diseases in Ontario," used by Apiary Inspectors for distribution among bee-keepers on their rounds. This handbook will be again reveised and sent to our complete mailing list of bee-keepers in May, 1911. Copies may be had on application.

Before the inspectors started on their rounds three inspectors' conferences were held, viz., at Toronto, London and Brockville. These were very helpful in securing uniformity of methods in their work. It was my privilege to preside at these meetings.

The Inspection Work.

Being relieved from the charge of a special district, I was able to give attention to the whole work. Every visit to an apiary by each inspector was reported on a specially prepared blank form. These reports were forwarded to me weekly for examination. All such material is kept in my office filed by counties and townships for ready reference as to individuals, also as to the status of beekeeping in any part of Ontario.

The usual amount of American Foul Brood was reported. This disease is pretty evenly distributed over that portion of Ontario lying south and west of the Trent Valley. It has cost the Province of Ontario hundreds of thousands of dollars, not only in loss of bees and honey, but in its disheartening effect on the men engaged in the industry. Much, however, is being done, and more can and will be done by the Department of Agriculture towards restoring a well-grounded confidence in beekeeping as a business by various methods of instruction.

The greatest menace at present is European Foul Brood. This scourge is known to have practically wiped out the keeping of bees over a territory of perhaps three hundred square miles around Ottawa, and five hundred square miles in Northumberland, Hastings and Prince Edward; it has also gained a slight footing at Fort Erie, on the Niagara River. Much loss by this particular disease might have been saved if the beekeepers had kept Italian instead of common black bees, or if they had Italianized as soon as they were warned. As the situation now stands, it seems to be spreading from these districts like a blight, carrying all black bees before it. Only those who Italianize their bees can hope to save them, as no system of inspection can cure black bees of this particular disease. Men with the right strain of Italian bees are securing enormous yields of honey right in the centre of the infected district. As the Irishman says, "It's an ill wind that blows nowheres," and there is not the slightest doubt that this wind of European Foul Brood, though ill enough, will blow money into the pockets of the men who will sit tight, get Italian bees, and weather the storm.

The full report of the inspection work is given in the Annual Report of the Ontario Beekeepers' Association.

The increased grant for inspection work has been of material benefit in the fight, but our greatest difficulty is to get efficient inspectors. Our best men are dropping out from year to year because their time is worth more at home in their own apiaries at that particular season than we are able to pay them for the work. What is needed is men with a special college training, such as this department hopes eventually to supply.

Short Course.

A short course for apiary instructors will be held May 1-6, 1911. We have been fortunate in securing the assistance of E. F. Phillips, Ph.D., in Charge of Apiculture, Bureau of Entomology, Department of Agriculture, Washington, D.C. Dr. Phillips has wide experience in Apiculture, both scientific and practical. Besides the practical and scientific lectures by Dr. Phillips and myself, the class will be given lectures by other members of the staff on such allied subjects as Bacteriology, Entomology, Chemistry of Honey, etc. The afternoons will be devoted to practical work in the College and neighboring apiaries, giving special attention to the detection and treatment of disease. A Foul Brood Conference will be held in connection on Thursday, May 4th, which all the local apiary inspectors of the Province and others interested are invited to attend.

In October, while attending the National Beekeepers' Convention at Albany, I spent some time investigating methods of apiary inspection in New York State, and interviewing the State Inspectors, also Mr. George G. Attwood, Director Fruit Branch, who directs this work.

I have also had the privilege of several interviews and considerable correspondence on these matters with E. F. Phillips, Ph.D., in Charge Apiculture, Bureau of Entomology, Washington, D.C.

Recommendations.

While progress can be reported along many lines mentioned in last year's report, the department is only just beginning to take up the things that should be done. The greatest need is for a revision of the time-table, so as to provide for handling the unwieldy First Year Class in smaller divisions, especially for practical work. There should also be some Apiculture lectures in the Second Year.

The awakened interest in this business both in Canada and the United States is sure to make openings for all the Apiculture graduates we can expect to turn out. Some First and Second Year students have already expressed their desire to take an Apiculture option when they come to the Fourth Year, and to prepare for this they should have some work in the Second Year at least. All graduates should have a more intelligent knowledge of bees than they can get in the time now allowed to this subject. This is particularly true of the future District Representatives, who will have county Beekeepers' Associations and Co-operative Honey Producers' Associations to deal with.

I would recommend that a Four Weeks' Short Course in Beekeeping be held, beginning in January, 1912.

During the coming winter months some lectures (illustrated with lantern slides), will be given at Farmers' Institutes, District Short Courses and University Extension lectures in different parts of Ontario.

Co-operative experiments have been taken up by the beekeepers of Ontario with a vim which has exceeded all expectations.

Some of the most important problems could not be touched for lack of time and trained help.

Saving a By-Product.

Many a business has been kept from financial ruin by the saving of a by-product, formerly wasted. A leakage of no mean proportions on the average Ontario farm is the nectar of flowers. The saving of this by-product, together with the increased yield of fruit and seed, often means the difference between failure and success to the farmer beekeeper. By advancing the interests of Apiculture we have the double satisfaction of causing two blades to grow where one grew before, and of saving several extra blades from being wasted.

Respectfully submitted,

MORLEY PETTIT.

PART XXI.

THE RESIDENT MASTER.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit this my second annual report, as Resident Master and Instructor in English, for the year 1910.

Affairs in the residence have preserved a satisfactory character. The dormitories accommodate 215 persons, of which 127 are students in their First Year, 47 in the Second Year, 21 in the Third, and 18 in the Fourth Year. Accommodation is also provided for the Assistant in Residence and for the Instructor in Athletics.

I regret to have to report an outbreak of mumps in the early part of the term. There have been, up to the present time, seventeen cases of this disease, the first having been noticed on October 14th and the last on November 28th. Of these seventeen, eight were treated in their own homes and the remainder at the College. Every effort was made, under the direction of the College Physician, to prevent the spread of the disease through the College. I should like to draw your attention to the advisability of having a small isolation hospital set apart from the residence. At present there is neither staff nor equipment sufficient to cope with a serious epidemic.

Another feature of the work is the organization of the College Volunteer Fire Brigade. This now consists of fifty students, who are divided into groups as follows:

3 Reels (10 men each)	30
2 Ladders (8 and 6)	14
4 Hydrant Men	4
2 Lantern Men	2
Total	50

Each team elects its captain, who is directly responsible for the condition of his appliances and the efficiency of his men. From time to time I receive reports from these captains as to work done, etc., and by false alarms and emergency calls keep up the standard of efficiency. I include a copy of a letter from Mr. Crawford, Inspector of Fire Equipments for Ontario, giving a list of extra appliances granted during the year.

Department of Public Works, Ontario,
Toronto, Ont., June 21st, 1910.

SIR,—I have the honour to state that I made a careful inspection of the new fire equipment and appliances installed in Agricultural College Buildings, Guelph, Ont., on June 16th and 17th, and beg to submit my report as follows:

Wm. Coulter & Sons supplied:	
40 Fire Extinguishers, cost $8.90 each	$356 00
Repairs to 23 Stemple Fire Extinguishers for College	65 00
17 Pike Axes with holders, $3.00 each	51 00
Smith Bros. Supplied:	
One 45-ft. Extension Ladder complete	50 00
" 35-ft. " " "	40 00
17 Steel Crow Bars with holders, $5.00 each	85 00
6 Ceiling Hooks, $3.00 each	18 00
6 Hose Keys to fit 2½ inch couplings	5 40
	$670 40

All of the above equipments are up to the guarantee which they contracted for. I instructed the Assistant Engineer and Boss Carpenter how to use the equipments in case of a fire occurring in any of the group of buildings known as the Guelph College buildings.

I beg to suggest that the Assistant Engineer, Mr. A. V. Green, and Mr. Crawford, the Boss Carpenter, be put in charge of the fire department, and that fire practice be held twice a month, when every member available should be present.

I would also recommend that a fire escape be supplied for the Consolidated School. There is only one stairway leading from the top floors, and if a fire occurred in the basement, the smoke would choke the stairway, and it would almost be impossible for the children to escape.

Yours truly,

(Signed) WM. CRAWFORD,

Inspector of Fire Equipments.

R. P. Fairbairn, Esq.,
Deputy Minister of Public Works,
Parliament Buildings, Toronto, Ont.

Our total equipment includes three reels in use, and one emergency reel, with all the accessories necessary for a fire equipment. There are in all sixty-four hand extinguishers, distributed through the College Buildings to the best advantage.

My work in English includes Composition and Prose Literature with the First Year and Literature with the Third Year. In Composition work I endeavor to teach the general principles of rhetoric and the broader technique of the essay. With a class of 145 students of various degrees of proficiency, a detailed course of grammar is impossible. Subjects are assigned for composition, and the essays are corrected, noted, marked and returned to the student. The prose work assigned for study is Scott's "Ivanhoe." A knowledge of the incidents and characters in the story is required of the students, and in addition some critical lectures are given on the structure of the novel, merits and defects of the story, characteristics of the author's style, etc. The more advanced subjects with the Third Year form one of the most interesting phases of the work. In addition to reading the "Twelfth Night" of Shakespeare and studying this play critically, I have given a series of lectures on "The Development of the Drama," explaining the various forms through which the drama passed in England, from the early religious play, through the first secular tragedies and comedies, to the Elizabethan dramatists and Shakespeare.

In conclusion, I wish to express my appreciation of the support given me by Mr. L. D. Jackson, who in addition to his other work has assisted me in the residence.

I am, Sir,

Yours respectfully,

G. H. UNWIN.

PART XXII.

THE LIBRARIAN.

To the President of the Ontario Agricultural College:

SIR,—I have the honor to submit herewith the report of the Library for 1910.

During the past year 1,231 volumes have been added to the shelves, and are classified as follows:

Agricultural Reports	36	History	17
Agriculture	106	Horticultural Reports	17
Bacteriology	27	Horticulture	34
Bees	18	Hygiene	41
Biography	35	Literature	98
Botany	66	Manual Training	12
Chemistry	44	Mathematics	9
Dairy	24	Meteorology	20
Description and Travel	44	Nature Study	19
Domestic Animals	93	Ornithology	4
Domestic Science	63	Physics	4
Drawing and Decoration	6	Poultry	3
Economics	53	Psychology	5
Education	52	Reference Books and General Magazines	50
Engineering	16	Science	23
Entomology	16	Science Reports	7
Ethics and Religion	66	Useful Arts	5
Fiction	49	Zoology	7
Fine Arts	24		
Forestry	5		
Geology	11		1,231

The following books have been added to the Reference Shelves:

Modern Achievement. 10 vols.
Dickens, Charles. Works.
Stoddard, John. Lectures. 15 vols.
Haydn. Dictionary of Dates, 1904.
School Science and Mathematics. 5 vols.
U. S. Weather Bureau Publications.

We have filled up as far as possible the horse, sheep and cattle records, many of the volumes being presented to the Library. The Clydesdale Horse Society of the United Kingdom presented us with fourteen volumes, the American Shropshire Registry Association with ten volumes.

Other gifts to the Library have been William Wye Smith's Selected Poems, presented by the author; Mrs. H. A. Michael, Studies in Plant and Organic Chemistry; Sir Edwin During-Lawrence, "Bacon is Shakespeare," from F. J. Burgoyne; Brown University Alumni Magazine Co., Memories of Brown; the Tercentenary Bronze Medal presented by the National Battlefields Commission.

We have added specimens of Canadian fiction to the shelves. These have been used in the English course in connection with Canadian literature.

The periodicals and bulletins which have been bound have amounted to 212 volumes. Only 26 have needed rebinding.

The circulation from Sept. 13, 1909, to Sept. 12, 1910, has been 4,883. This includes books loaned to students for home use, but not the books loaned to members of the staff. The classification of these books was as follows:

General Periodicals	305	Fine Arts	39
Philosophy	22	Literature	803
Religion	15	Fiction	782
Sociology	378	History	143
Science	941	Biography	76
Useful Arts	220		
Agriculture	1,159		4,883

We wish to take this opportunity of expressing our appreciation of all our exchanges, especially of those of the United States Department of Agriculture, and of the Experiment Stations of America, Australia, Cape Colony, England, Europe, India, Japan and South America.

Respectfully submitted,

EDITH C. DWIGHT.

PART XXIII.

THE PHYSICIAN.

To the President of the Ontario Agricultural College:

SIR,—As requested by you, I present my report for the current year.

It is perhaps unnecessary to detail at greater length than in former years the many cases of minor injuries and ailments which have occurred in the College and Macdonald Hall during the year, as in number and character they have been such as we usually have. I regret, however, to report a number of cases of grave illness, requiring care in the city hospitals for considerable time. During the winter and spring months one patient was in hospital forty-two days, one fifty-one days, and one thirteen days. All, I am glad to say, made good recoveries.

During the autumn two cases of cerebral concussion came under my care, one received in football and the other from a fall in the experimental barn. Both required hospital care for a time and made satisfactory recoveries. In addition to other injuries of less severe character and the ailments usually occurring in the community, we had an invasion of mumps, from which about thirty of the students were ill. Such occurrences emphasize the need of an isolation hospital in connection with the College, as I have repeatedly urged in the past.

Respectfully submitted,

(Signed) W. O. STEWART,

Physician.

Guelph, Dec. 1, 1910.

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REPORT

OF THE

Ontario Veterinary College

1910

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

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1911.

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29-37 Richmond Street West,
TORONTO.

To the Honourable JOHN MORISON GIBSON, K.C., LL.D., etc., etc., etc.
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of Your Honour the Report of the Ontario Veterinary College, for the year 1910.

Respectfully submitted,

JAMES S. DUFF,

Minister of Agriculture.

TORONTO, 1911.

COLLEGE STAFF AND SUBJECTS TAUGHT.

E. A. A. Grange, V.S., M.S., Principal,
Contagious Diseases of Animals and Veterinary Hygiene.

T. G. Brodie, M.D., F.R.S.,
Physiology.

C. Heath Sweetapple, V.S.,
Librarian and Curator of the Museum.

W. J. R. Fowler, V.S., B.V.Sc.,
Anatomy, Obstetrics, Sporadic Diseases of Cattle, and Surgery.

J. A. Amyot, M.B.,
Bacteriology.

J. N. Pringle, M.R.C.V.S.,
Sporadic Diseases of the Horse, Dentistry, and Principles of Horse-shoeing.

D. King Smith, M.B., V.S.,
Pathology and Histology.

M. D. McKichan, B.A., M.D.,
Zoology and Demonstrator.

Paul L. Scott, M.B.,
Pharmacy.

C. G. Saunders, V.S., B.V.Sc.,
Canine and Feline Diseases.

H. E. Hurd, V.S.,
Dairy Inspection.

Dyce W. Saunders, K.C.,
Veterinary Jurisprudence.

F. B. Kenrick, B.A., Ph.D.,
Chemistry.

C. A. Temple, M.D., C.M.,
Materia Medica.

J. Horace Faull, B.A., Ph.D.,
Botany.

A. C. Walker, V.S.,
Meat Inspection.

C. F. Bailey, B.S.A.,
Breeds and Breeding, Foods and Feeding, Judging Animals.

G. B. Cash, V.S., B.V.Sc.,
Demonstrator.

H. G. Wilson, B.A., M.B.,
Demonstrator.

L. T. Addison, B.A. M.D.,
Demonstrator.

S. A. Cudmore, B.A. (Oxon.),
Tutorial Instructor.

*Andrew Smith, F.R.C.V.S., D.V.Sc.,
Professor Emeritus.

Jas. E. Anderson,
Executive Clerk.

*Died August, 1910.

Report

OF THE

Ontario Veterinary College

1910

To the Honourable Minister of Agriculture, Toronto.

SIR,—I have the honor to submit the following report of the Ontario Veterinary College from the 1st day of November, 1909, to the 31st of October, 1910.

The number of students in attendance during the year 1909-10 amounted in all to 318; the number of students during the year 1910-11 amounted in all to 372. This wholesome increase seems to depend to some extent on the number of students of the old two year school returning for a third year course, and also to the fact that the third year class of 1908 was very small.

The teachers on our staff, at the present time, number 21, and their names, subjects taught and method adopted in teaching the various subjects will be found on other pages in this report.

Some points of interest, which may be regarded as outside College work, may be stated at this point.

During the autumn of 1909 an invitation was extended from the Agricultural College at Guelph to visit that institution at the time of the Winter Fair. This invitation being taken advantage of by our College, we proceeded to Guelph during the week of the Fair, and our visit to the College was an educational treat, which was highly appreciated by the members of our various classes, and those of the faculty who were able to attend; and we wish to extend to President Creelman of the O. A. C., and Members of the Staff, our hearty thanks.

At the same time our College was treated to complimentary admission to the Winter Fair, and the courtesy extended to us by the officers of that institution is very highly appreciated.

Later on in the College year I attended an International Association in the city of San Francisco, Cal., known as the American Veterinary Medical Association. It is the largest and most influential organization of its kind upon this Continent, if not the entire world, having a membership of over 1,200 and issuing an annual report of its proceedings covering about 600 pages, in which are to be found the papers and discussions on the burning questions of the day, relating to Veterinary Science, and contributed to by most distinguished Veterinarians, especially on this Continent. I had the honor of addressing the gathering, and, amongst other things, made a request that the next meeting of the Association be held in this Province. My request has been favorably acted upon, and the next annual meeting is to be held in the Convocation Hall, of the University of Toronto, August 22nd to 25th, 1911. It is estimated that we will have from 1,000 to 1,500 visitors at this gathering.

Shortly after my return from California, I received an invitation from Cornell University of Ithaca, New York, to address the students and veterinarians at that Institution, and subsequently presented the following address:—

NEUROSES IN THE LOWER ANIMALS.

In approaching a discussion of the various forms of Neuroses in the lower animals, it might be well, in the first place, to arrive at some conclusion as to that which may be regarded as disease, habit, or idiosyncrasy; and while it may be a somewhat difficult task to draw sharp lines between these conditions in a way that one will not overlap another at some place or time, in such a manner that each becomes a mere synonym of the other, yet it may be possible to come to an understanding which will serve our purpose at this meeting.

Regarding the definition for disease, I am forced to admit a difficulty in finding one which will cover all cases, and to which exception may not be taken. If we refer to the derivation of the word, which, when somewhat liberally translated means "asunder from ease," we cover a great deal of ground, and which perhaps defines it in a large majority of instances. At the same time, it must be admitted that disease occurs when "asunder from ease" does not apply, because there may not be real pain associated with the disorder. In trying to arrive at a definition I have consoled myself with the idea that disease may be defined to be "an abnormal condition of a vital principle," that is to say, whenever a tissue is thrown off the line of that which may be regarded as normal, then, according to this definition, it would come within the pale of disease. This definition, however, would exclude, in some instances at all events, neuroses, because these conditions often exist without there really being a recognizable abnormal condition of the aforesaid vital principal, and we meet with conditions of idiosyncrasy, on the other hand, where actual pain may be produced without recognizable pathological change in the tissues.

Without wishing to split hairs to too great an extent, it may be said that neuroses in the lower animals may be defined to be a disease or condition supposed to have its seat in the nervous system without any recognizable lesion in the structure of the parts and without any material agent producing them in all instances. These diseases have not been recognized in Veterinary Literature to any extent, as far as I am aware, which is one of my reasons for bringing the subject before you to-day, and, as I understand it, the conditions may be regarded as temporary or chronic. The temporary variety may only last for a few minutes, and it may be the result of an objectionable noise, objectionable odor or gruesome looking object, which will in their turn produce a variety of symptoms. These symptoms may occur in one animal in a most pronounced manner, while its stable mate will hear, see, or smell the same things without its having the slightest effect upon it. This is where idiosyncrasy seems to over-lap neuroses, and, idiosyncrasy, as you are all aware, may be defined to be "a condition peculiar to an individual through which it may have peculiar antipathy through its senses to certain things, and may or may not be accompanied with pain," while the chronic variety will last for a considerable length of time, and, in all probability, become permanent, especially in older animals, and finally depart from the functional disorder which existed in the preliminary or primary stage of the complaint, and become an organic disease. Later, I will call your attention to some of those cases in which the organic complaint seems to have been induced by a functional disorder, and cases which are vividly before me were brought to my notice in Canada a month or two ago; and, while I have some hesitancy in regarding them as pure cases of neuroses, yet, in as much as the cause of the disorder is still wrapped in the greatest obscurity, we have reason for so considering them. The condition to which I refer is commonly spoken of with us as "Horse-tail sickness," and for many years remained a

mystery among the average laymen. Indeed, it was not until the Botanist, prompted by the havoc this disease was creating, was led to investigate the nature of the food upon which infected animals were living, or dying, as the case might be, that it was finally demonstrated that they were eating a plant technically called the "Equisetum Arvense," or, in layman's parlance, "Horse-Tail." This disorder is known as "Equisetosis," and is accompanied with a variety of symptoms; such as unthriftiness, general debility, falling off in condition, amounting in later stages to emaciation; depraved appetite, in which the animal exhibits a desire for the plant which caused the disease. Later on the animal loses control to a greater or less extent of its voluntary muscles, and its movements are inco-ordinate; the pulse becomes affected (depressed), the extremities get cold and the visible mucous membranes pale; consciousness remains unimpaired until near the end. Towards the close of the disease, if appropriate remedies have not been given and the cause of the disease is kept up, the animal will exhibit convulsive paroxysms which may be so violent as to exhaust the animal, although in a good many instances, when the muscles become partly paralyzed, the animal will lie down or fall, and hypostatic congestion becomes a fresh complication of the disorder, and, in some instances, seems to be the immediate cause of the animal's death. Although this disease is a serious one if permitted to run its course, yet appropriate remedies have, in a large percentage of cases, been administered with beneficial results. The class of medicines which have gained most favor are eliminatives and tonics, such as purgatives and diuretics followed by tonics, especially nerve and heart tonics.

In the very earliest stage of this disease there does not appear to be any lesion which may be regarded as diagnostic, yet, in a short time, various ones present themselves, which might almost be regarded as specific for the disorder. In this and similar cases I am inclined to regard the disease as dietetic neuroses, and, were I not afraid of exhausting your patience, I might follow the disorder occasioned by dietetic influence for a considerable length, but I will leave it for the present, except I would like to add a peculiar case of neurosis in a horse that once belonged to myself, in which the animal exhibited the most exaggerated form of "String Halt" (and here let me say that I regard "String Halt" as a form of neurosis) when first brought from the stable, and not only did she exhibit peculiar neurotic symptoms as far as her hinds legs were concerned, but her head would be shaken in a manner that one might easily imagine she had an irritating insect in her ear. After being driven for a quarter of an hour or so, during which time defecation would occur, the symptoms would subside entirely, and the animal would continue its journey as smoothly as any horse I ever drove. It always seemed to me that the dietetic system was to blame for the peculiar symptoms in this animal.

While speaking of imperfect gait in an animal, I can call to mind a number of cases where lameness was evident and yet no cause could be attributed to the disease, nor could it be located with anything like certainty. Then, in the course of a few days, the symptoms would pass away and the animal become all right with or without treatment. These cases, I am aware, are often attributed to neuralgia or rheumatism, but I prefer to call them "neurosis," and the lameness, which is the result of neurosis, is sometimes most severe. I will have to repeat a description of some cases which were brought under my notice a few years ago in one of the most important cities of this country. A year or two ago, while in the City of Washington, I had the pleasure of enquiring into a peculiar disease there, commonly called gong lameness, but is more scientifically named "Sonus Neurosis,"

which when freely translated means a disturbed condition of the nervous system by sound; such as the ringing of a bell, the rattling of metal upon wood, or the striking of a fire alarm gong or other sudden noise. The first of these cases, which I will describe, seem to have been demonstrated as resulting from the fire alarm gong, while others were caused by noises of different kinds which came under my notice in every day practice. The fire alarm cases were described to me by the official Veterinarian for the District of Columbia, who stated that he received a call one day from the Fire Department, saying that a certain horse was very lame, whereupon he immediately visited the animal, but was somewhat surprised to find on his arrival that the horse to all intents and purposes was perfectly sound, and did not exhibit organic disease of any description, so dismissed the case, feeling that a false alarm had been given. In a day or two he was called again, but with like results. However, he was soon called a third time, and, upon finding things about the same as on previous occasions, it was decided to get to the bottom of the mystery if possible. On interrogation of the driver it was learned that the symptoms manifested themselves when the electric fire gong was sounded; this, together with the suddenness of the attack and the peculiar symptoms which were manifested, suggested that some kind of an electric shock was the cause of the trouble, but the most careful research failed to discover a conductor, and rather dissipated the theory of electricity. The failure finally suggested the idea that possibly the sudden noise of the fire-gong might in some mysterious manner disturb the nervous equilibrium of susceptible horses; and to test the accuracy of the thought he had a susceptible animal sent to his infirmary, where a suitable gong was erected and the test applied, and singularly enough the peculiar symptoms were immediately developed; not only this, but it was shown that by repeatedly ringing the gong a degree of clonic spasm of the voluntary muscles could be produced which would eventually cause the animal to fall to the ground.

There were a great many of these cases in the early days of the trouble, but after the discovery of the cause and modification of the alarm system the number was reduced to the minimum, and now they are few and far between.

After describing these cases to students at the Ontario Veterinary College, before leaving for their Summer's practice under a preceptor last Spring, I have been interested by a number of similar cases which were related by them on their return to College in the Autumn, and was gratified to learn that the disease made a more or less rapid recovery when the cause was removed in the early stage, and it now appears to me beyond any reasonable doubt that the cause of lameness in the foregoing cases was the result of clonic spasm produced by the gong through the auditory nerve.

I have had a number of cases similar to the foregoing brought under my notice, in isolated instances of my own practice; one horse belonging to a foundry company was reported to me by a driver, who stated that when the noon-day whistles blew the horse would jerk one fore-leg in the air and hold it there until the whistles ceased to blow, a few moments after which he would put it down again and proceed as if nothing had happened. Still another case, which was even more peculiar than this, was brought to my notice by a gypsy horse-trader, who invited me one day to get into his waggon and see his horse perform. I accepted the invitation, and, when I had seated myself, the gypsy began to pound the wooden dash-board of his waggon with the buckle on the end of his reins; no sooner had the clatter commenced than the horse exhibited the most peculiar lot of stunts I ever saw; he seemed to fire his front legs off first, but a few more raps of the buckle brought the hind legs into action, and soon he was going in a manner that

would cause the proverbial cat on hot bricks to turn green with envy; he jerked all his legs in rapid succession up to his body, and produced a spectacle in horse-flesh that is easier to imagine than describe; he certainly had a very bad attack of *Sonus Neurosis,* but finally recovered when the clatter of the buckle was suspended. These I also regard as well marked cases of clonic spasm produced by sound. The wave of sound not only causes horses to go lame, but it sometimes causes people to weep, dogs to howl, and other animals to perform in a variety of ways.

Passing on to other forms of neurosis. A year or two ago a case of somewhat unusual nature was brought under my notice in a horse which presented all the characteristic symptoms of tetanus or lock-jaw, but which made such a rapid and complete recovery that I have become convinced it was a case of neurosis and not one of ordinary tetanus.

The horse in question was a large, powerful, high-strung creature, whose sole object in life seemed to be "to get there." It had been working all the day previous to the sickness in a heavy three-horse reaper, and the owner, in giving a history of the case, informed me that his horse had been in a highly nervous state, wanting to do the work of all three horses, from start to finish. This ultra nervous condition bordering on frenzy was in my opinion caused by the incessant noise of the machine.

Soon after the horse had been taken to its stable at the conclusion of the day's work, evidences of sickness began to manifest themselves and I was requested to visit the animal, which I found with its jaws firmly locked, legs apparently propping up the body, the tail evincing those peculiar convulsive movements so characteristic of tetanus, as well as other symptoms of the disorder. A careful search for wounds from which to trace the cause of the disorder and on failure to find any, a full history of the case was then obtained from the owner, after which absolute quiet with small doses of calmative medicines was the line of treatment recommended and adopted, and in about 24 hours the horse appeared to have made a complete recovery, which could hardly have occurred if the symptoms had been produced by the ptomain of a bacterium; and I regarded it as a pure case of neurosis.

And now let me call your attention to that interesting disease Milk-fever, or Parturient apoplexy, as it is often called; but here I will put the cart before the horse and discuss the cure of the disease first, or, rather, give my views as to how the modern cure is effected, and in doing so will just review the more recent methods of treatment in a most summary manner for the sake of a better understanding. First we have the injection of the udder with a solution of iodide of potassium, which is said to have reduced the mortality of the complaint from 75 per cent. to less than 20; recent developments have caused me to believe that this percentage would have been still further reduced, if the iodide had been left out, and the udder injected to repletion with sterile tepid water. Next came the injections of solutions of creolin, eysol, carbolic acid, normal salt solution, oxygen gas, injected under pressure.

The object of these remedies was based on that which I now believe to be an erroneous theory, in connection with the etiology of the malady, viz.: that it is a bacterial disease of the udder and that the agents destroyed the germs, or acted as antidotes for the poison which the supposed germs produced.

As the oxygen treatment seems to have gained most favor, and reduced the mortality of the complaint to the minimum, I will confine my remarks for the present to that line of treatment, and the question at once arises, How does the oxygen produce the marvellous cures we hear so much about? I could answer the

question in a very few words in giving my opinion, but I prefer to preface them by statements of Veterinarians with whom I have talked on the subject, and which lead up to the theory with which I am much impressed. First, I was asked to believe that the free oxygen destroyed anaerobic germs, and that with the removal of the cause the effect soon followed, but this explanation has not appealed to me with any force, as the bacterial nature of the disorder has not been demonstrated, and I am far from being convinced that micro-organisms are responsible for its presence. The late Professor Smith of Toronto informed me, some time ago, that an old country acquaintance of his, and a close student of such disease, was of the opinion that the oxygen treatment produced an altered condition in the circulation of the brain; that statement seemed to me to strike the nail on the head, but he did not say just how this altered condition was produced; and it is now left for me to venture the opinion that this altered condition of the circulation is produced by nervous impression from the udder to the nerve centre; and in this case the impression is introduced into the economy, not by *sound,* but by touch, or contact from the air of the force pump on the walls of the milk ducts, from which points it is conducted through an intricate nervous system to the circulation of the brain, where it produces its salutary effect, and this line of treatment I now regard as *Neuro-therapy.*

This theory is not based on mere fancy, for we have too much evidence demonstrating that nervous impression, neurosis, does alter the diameter of the blood vessels to admit of any doubt; take the blushing cheek for instance, where certain forms of embarrassment cause an increased flow of blood to the face; or on the other hand, take the pallid face of fear, where the blood is forced out of the part by the contraction of the blood vessels.

Regarding the cause of milk-fever, let me call your attention to some theories which have become rather deep-rooted in certain quarters, but which appear, on closer investigation, to be erroneous if not impossible. First we have the old theory which attributed the cause of the trouble to the absorption of the colostrum of the first milk; but this idea seems to receive a knock-out blow through a custom which is reported to prevail amongst the Jersey breeders on the island, and is to leave the newly-calved cow for 24 hours without milking, by which method the dread disease is said to be practically removed. I do not take kindly to this plan, as I am fearful lest the overstocking would do more harm than good; and it is well to remember that the oxygen treatment cures all, or nearly all, cases in a few hours. Following on the heels of this theory, comes the opinion from *all* sides, that deep milkers and plethoric animals are prone to the disease; well, I am hardly bold enough at this time to oppose this idea flat-footed, but I think it is over estimated, and when I add to this that during eight years when I had veterinary supervision over the cattle at the Ontario Agricultural College, not a single case of milk-fever came under my notice in the herd, and I think they were in as good condition as a liberal supply of public funds could make them, and many of them were deep milkers. Again, I held a similar position at another College for over twelve years. Here we had a larger herd and probably deeper milkers, for we had several record breakers in it. This herd was also fed from a liberal supply of public funds, yet I had only one case of milk-fever in all that time. True, it was in a pure bred Jersey, but she was not considered especially valuable as a milk producer, either in quality or quantity; and I only considered her in fair order as far as condition was concerned. Now, in cases like these and many others that I could quote, vividly before me, is it any wonder that I accept the

deep milking and plethoric idea with a good deal of reserve as a sole factor in the production of this disease?

Regarding the bacterial and ptomain theory, I must say that, from my view point, it does not seem to have a leg to stand on, for neither post-mortem appearances or anything else have produced evidence which will withstand the dictates of true science in support of the theory, and, until I am better informed, I can only look upon it as mere supposition.

In reviewing some of the literature of the causes of milk-fever, I was much impressed with the views of that distinguished Veterinarian, the late George Fleming, whose quotations and writings favored the theory that the symptoms are caused by an altered condition of the circulation of the brain, but the cause of this altered condition is not accounted for and is still wrapped in obscurity, so neurosis may yet have to be reckoned with before the problem is solved, but neurosis and environment, if I may be permitted to link the two together, have such an extraordinary influence over both man and beast that it scarcely seems a wild fancy to give them a place as factors in both the cause and cure of the disease in question. Circumstances which stimulate this line of thought are to be found in one's every-day life.

I have seen race-horses so affected by the odour of wild animals that symptoms were produced resembling a brain storm, and I have seen cattle affected in a similar manner.

In closing this discussion I feel that I have hardly approached the threshold of what might be said regarding neuroses in the lower animals, but one excuse which I have for bringing the question before you at all is that so little seems to have been written, especially by Veterinarians, on the subject, that I have a lingering hope the question of neurosis may receive from some of you further and deeper consideration, and thanking you for the kind consideration you have given to my somewhat rambling dissertation, I will leave the question in your hands.

The number of students in attendance at the beginning of the Autumn of 1910 was made up as follows:—

	1st Year.	2nd Year.	Third Year
From Ontario	27	24	29
From other Provinces	24	23	29
From United States	35	33	45
From other Countries	1	7	4
	87	87	107

Method Adopted in the Teaching of Various Subjects in the College Course.

Contagious Diseases of Animals.—Is taught by lectures illustrated by diagrams, diseased tissues, and, when possible, with infected animals.

Veterinary Hygiene.—Taught by lectures, illustrated with materials used in promoting health and observations in the Veterinary Infirmary of the College.

Sporadic Diseases of Animals.—Embracing the various diseases which are not regarded as contagious. Their causes, symptoms and treatment are thoroughly described in lectures, illustrated with numerous specimens now in the Museum of the College, also with affected animals as they occur from time to time in the practice of the Infirmary.

Veterinary Anatomy.—Is taught first by descriptive lectures in the class room, and the applied science by a full course of dissection in the commodious dissecting room near the main building of the College.

Veterinary Surgery.—Is taught first in the class room by illustrated lectures, and the applied science or practical work of the course is freely demonstrated in an amphitheatre fitted up for the purpose.

Physiology.—Includes a course of about sixty lectures on the physiology of domestic animals, and is taught in one of the class rooms of the University of Toronto.

Veterinary Materia Medica.—Embraces a description of the most important drugs and agents used in the cure of disease and the alleviation of pain, including their actions, uses and doses for the various domestic animals.

Veterinary Pathology.—The course in this subject extends over three years and includes a series of lectures and laboratory demonstrations, both macroscopic and microscopic.

The lectures are divided so that general pathology is taken up the first year, the following year devoted to special pathology, and the third year to microscopic pathology. The latter is a recent amplification of this course and includes a study of the tissues of animals affected with disease.

Veterinary Histology.—Is taught by illustrated class room lectures, all of which are demonstrated in a spacious laboratory, conveniently arranged for the purpose, where the student is required to prepare, mount, stain and examine with the aid of a microscope various healthy tissues.

Veterinary Obstetrics.—Is taught by a full course of lectures, illustrated with large diagrams and numerous instruments used in the practice of this most important art.

Post Mortem Demonstrations.—Are conducted in the dissecting room of the College, where remote cases of disease are often brought to the surface and the student materially benefited thereby.

Bacteriology.—Is a branch of the College course which receives consideration through numerous lectures in which special attention is given to technique in preparing and studying certain micro-organisms or germs, especially those which are believed to cause disease.

The study of toxins, and the preparations of anti-toxins used for the cure of disease, vaccines used for the prevention of disease, as well as other biological products of importance, are extensively discussed and demonstrated. For teaching this subject, both theoretically and practically, the College is equipped with a very convenient laboratory and class room.

Chemistry.—Is taught by lectures and a course of laboratory instruction at the University of Toronto.

Zoology.—Is taught by illustrated class room lectures, and by laboratory methods.

Botany.—Is taught by lectures in the class room. The applied science is taught by laboratory methods and from specimens procured in the field, and special attention is given to plants which are liable to cause sickness in or poison domestic animals.

Parasitology.—Includes a description of various parasites which attack both the external and internal economy of animals, many of them giving rise to most

serious disease from the irritation which they cause themselves, while others are injurious on account of transmitting contagious disease from one animal to another. This branch of our course is taught by class room lectures, while the practical feature of it is demonstrated by specimens which are contributed from time to time by friends of the College.

Veterinary Dentistry.—Is a branch of our course which grows in importance from year to year, as dietetic diseases are now more often traced to irregular or diseased teeth than they were in former years, when special attention was seldom given to the diseases of the teeth of the lower animals.

The subject is taught by illustrated lectures in the class room, and the practical education of the student in the art fully demonstrated in the amphitheatre of the College.

Breeds and Breeding of Domestic Animals.—Is taught by lectures illustrated by diagrams in the class rooms, and the practical feature of the study is illustrated by bringing famous animals before the class of the third year. In the practical work of this branch the College feels much gratitude towards prominent breeders in the vicinity of Toronto for the courtesy and entertainment which has been extended to our young men by owners of dairy stock farms and horse-breeding establishments. In speaking of this feature of our work, I desire to make mention of the courtesy of the directors of the Christmas Fair at Guelph, where our students enjoyed a day which we look upon as a Red Letter Day in the year.

Meat Inspection.—Is taught both in the class room of the College and at abattoirs, in a manner which accords with the laws and regulations of Veterinary inspection throughout the Dominion of Canada.

Horseshoeing.—Is freely discussed in the class room and practical illustrations of the art are conducted in the amphitheatre of the College.

Veterinary Pharmacy.—Is one of the most recent as well as important additions to our curriculum, and is now being taught in the class room, and the practical feature of the science is taught in a convenient laboratory and demonstrated by an efficient corps of instructors.

Veterinary Jurisprudence.—Consists of a course of lectures, including a number of subjects which are important to the veterinary surgeon, such as contracts relating to the purchase and sale of live stock, unsoundness and vice in horses or other animals, the straying and impounding of cattle, laws relating to transportation of live stock, laws relating to the spread of malignant diseases, laws relating to diseased meats, laws of the road, the law of warranty and kindred subjects.

Dairy Inspection.—Includes lectures on the construction of the dairy barn and milk house, the care of utensils, the handling of milk from the time it is drawn from the cow until it is placed upon the market for sale; dairy cattle in health and disease, especially those which are communicable to the human family through milk, and various other matters relating to dairy inspection.

The last three subjects have been added to the course during the past year, and are most valuable additions, as is also the additional work in Pathology, which consists of a laboratory course for Third Year students.

While submitting this report it may be opportune to include a statement of the records of some of our graduates of last spring (1910), which were made before various Provincial, State and Dominion Boards of Veterinary Examiners, and reported to me from time to time.

A report comes to me from one of our recent graduates in Missouri, stating that fifteen candidates presented themselves for examination before the Board of Veterinary Examiners in that State, and of the fifteen the one from this College, under the new regime, was the only one to pass all the examinations at that time. The other candidates were made up of four from the Chicago Veterinary College, five from Kansas City Veterinary College, three from the Veterinary Department of the State University of Ohio, and two from the McKillop Veterinary College of Chicago.

At Vancouver, B.C., the examiners rejected all the candidates except one who, by the way, got his training and graduated here last April.

Word comes from one of our students in Minnesota that he passed the State Board with an average of 93 per cent., and states that it would have been even higher had there not been a typographical error in one of the questions.

Illinois decided to permit the registration of our candidates after examining their credentials, and waived the usual State Board examination.

From Ohio reports come to me that the examination was not a difficult matter, and, as I have seen a list of the questions, I can hardly conceive how any man could pass through this College and not render a first-class account of himself in the examination as presented.

An official communication from Pennsylvania informs me that five of our graduates have received State Certificates permitting them to practise in that State.

Connecticut and Massachusetts, I am informed, have also passed young men from this College. I am also informed that the examiners in the Province of Manitoba spoke in even flattering terms concerning our graduates who presented themselves for examination this year. The Examining Board of the Dominion of Canada passed some thirty-three of our candidates with honors.

The foregoing rather looks as if we were giving an education here which appeals to the various Veterinary Examining Boards of this country, which may be regarded as a good authority for consultation or reference as our course of instruction expands.

In April, 1910, the closing exercises of this College were held in the Convocation Hall of the University of Toronto, and 92 students of our College were granted the diploma of the institution, awarding them the degree of Veterinary Surgeon.

In June of the same year and at the same place 66 former graduates of the College were granted the degree of Bachelor of Veterinary Science by the University of Toronto.

The following is the financial statement for the year ending 31st October, 1910:—

RECEIPTS.		EXPENDITURE.	
Fees	$18,820 25	Salaries	$18,424 45
Miscellaneous	455 79	Rent	5,600 00
		Fire, light, etc.	1,137 95
		Contingencies	6,816 48
Total	$19,276 04	Total	$31,978 88

The Calendar of the College contains a full statement of the courses provided, copies of the examination papers and class lists.

E. A. A. GRANGE, V.S., M.Sc.

Temperance Street, Toronto.
31st October, 1910.

AN ACT RESPECTING THE ONTARIO VETERINARY COLLEGE.

HIS MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

Short title.

1. This Act may be cited as "The Veterinary College Act."

Ontario Veterinary College, continued.

2. The Ontario Veterinary College heretofore established in the City of Toronto, and conducted by the Ontario Veterinary College, Limited, under Letters Patent issued under the Joint Stock Companies Act, and to which certain powers were given by the former Agriculture and Arts Association, is hereby continued as The Ontario Veterinary College, under the direction of the Minister of Agriculture.

Appliances and equipment of College.

3. The said College shall be furnished with all such appliances and equipment as may be necessary for theoretical and practical training in the science and art of veterinary medicine, and in such other branches of education as may be requisite for the intelligent and successful performance of the business of a veterinary surgeon.

Principal and officers.

4. The Lieutenant-Governor in Council may appoint a Principal and such professors, lecturers and instructors as may be deemed necessary for giving instruction in the College and the promotion of its usefulness, and may pass by-laws regulating and prescribing their respective duties.

Substitution of courses in Agricultural College, etc.

5. The Lieutenant-Governor in Council may authorize the making of arrangements whereby instruction in any of the subjects prescribed to be taught in the College may be provided by the University of Toronto or by the Ontario Agricultural College, or by any other College affiliated with the University of Toronto.

Government and control of College.

6. The government of the College shall be under and according to such rules and regulations as the Lieutenant-Governor in Council may from time to time prescribe, and such rules and regulations shall contain provisions for the standard and mode of admission; the course of study; the fees to be charged; the sessions, terms and vacations; and such provisions as may be deemed expedient touching the conduct of students.

Rights and standing of graduates.

7. Every student upon the successful completion of the course of study, upon passing the prescribed examinations, and upon satisfactory compliance with the rules and regulations of the College, shall be admitted to the standing of a Veterinary Surgeon and shall have all the privileges and rights accorded by statute to a Veterinary Surgeon, and there shall be issued to every such student a diploma granting him the title, degree and standing of Veterinary Surgeon, such diploma to be attested by the signature of the Principal of the College and the Minister of Agriculture.

Issue of duplicate diploma in certain cases.

8. The Lieutenant-Governor in Council may by order make provisions whereby in case of the loss or destruction of any diploma issued by the former Agriculture and Arts Association, the former Ontario Veterinary College, Limited, or by the Minister of Agriculture, a duplicate diploma may be issued to the person entitled to the same.

Accepting gifts, etc., on behalf of College.

9. It shall be lawful for the Lieutenant-Governor in Council in behalf of the Province to accept, hold and enjoy any gifts, bequests or devises of personal or real property or effects which any person or any government may think fit to make for the purpose of the said College.

Advisory Board.

10. The Lieutenant-Governor in Council may, if deemed advisable, appoint an Advisory Board to advise and assist the Minister of Agriculture in the management of the College, and may by Order-in-Council prescribe its duties and powers and the amounts to be allowed for the services and expenses of the members of such Board.

Affiliation with University of Toronto, continued.

11. The affiliation of the College with the University of Toronto is hereby continued, such affiliation to be only to the extent of enabling the students of the said College to obtain at the examinations of the University such rewards, honors, standing, scholarships, diplomas and degrees in Veterinary Science as the University under its statutes and the Acts of the Legislature in that behalf may be allowed to confer.

Annual report of Principal.

12. The Principal of the College shall at the close of each year present to the Minister of Agriculture a report upon the work of the College in such form as the Minister may approve, setting forth the staff, the course of instruction, the students in attendance, the examination results, the income and expenditure, and such general information as shall show the work being done, and this report shall be laid before the Legislative Assembly within the first thirty days of the session next ensuing.

Power to purchase or lease lands, etc.

13. The Lieutenant-Governor in Council may purchase or acquire or lease such buildings and premises as may from time to time be required for carrying on the work of the College.

Lease from Andrew Smith approved.

14 The lease of the buildings and premises used by the said College from one Andrew Smith to the Minister of Agriculture, as representing His Majesty the King, and bearing date the twenty-eighth day of July, one thousand nine hundred and eight, is hereby approved.

15. No person or persons, association, company or organization other than is authorized under this Act shall, by advertisement or otherwise, use the name of the Ontario Veterinary College, and no person or persons, association, company or organization shall, by advertisement or otherwise, use any name similar or analogous to that of the Ontario Veterinary College, without first receiving the consent of the Minister of Agriculture in writing.

Penalty.

(*a*) Any persons violating the provisions of this section shall, upon conviction thereof, be subject to a fine not exceeding $50 and in default of payment thereof be liable to imprisonment for not less than thirty days.

Rev. Stat. c. 184

16. Section 1 of *The Act respecting Veterinary Surgeons* is hereby repealed.

Thirty-Second Annual Report

OF THE

Ontario Agricultural and Experimental Union

1910

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
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1911

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WILLIAM BRIGGS,
29-37 Richmond Street West,
TORONTO.

To the Honourable JOHN MORISON GIBSON, K.C., LL.D., etc., etc., etc.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Agricultural and Experimental Union for 1910.

Respectfully submitted,

JAMES S. DUFF,

Minister of Agriculture.

Toronto, 1911.

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MEMBERS FOR 1911.

The following list of members includes all of those who are or have been connected with the Agricultural College, and have paid the annual membership fee for the present year. It is quite distinct from the list of co-operative experimenters, of whom there are now about 6,500.

Name.	Address.
Addison, J. L.	Box 118, Forest.
Aikenhead, W. M.	Easton, Md. U.S.A.
Allan, F. W.	Churchill
Allan, J. N.	Canboro
Anderson, J. F., Jr.	Raymond, Alta.
Andrew, D. A.	Lucknow.
Angle, P. E.	Simcoe.
Angle, W. B.	Forks Road.
Annand, F. W.	Halifax, N.S.
Auld, J. H.	Guelph.
Austin, R.	Tottenham.
Austin, H. S.	Lynn Valley.
Baker, M. R.	Collingwood.
Baldwin, M. M.	Colchester.
Ballantyne, R.	Avonton.
Barnes, H. C. H.	Victoria, B.C.
Barnett, C. A.	Rannoch.
Barnet, I. T.	Living Springs.
Batty, E. C.	Oshawa.
Beaupre, F. C.	Simcoe.
Begg, R. E.	Tiverton.
Bengough, W. L.	Grimsby.
Bennett, F. A.	St. Thomas.
Benson, H. N.	Ladner, B.C.
Bergy, S. A.	Mannheim.
Bethune, Dr.	O. A. C., Guelph.
Binnie, T. H.	Bunessan.
Boddy, R. A.	Toronto.
Bourke, B.	Vierfontein, S. Africa.
Bowman, Wm.	Georgetown.
Bradt, E.	York.
Bramwell, R. S.	Cartwright, Man.
Breckon, W. D.	Waterdown.
Britton, J. E.	Toronto.
Brokovski, A. J.	Battleford, Sask.
Brown, R. W.	Attercliffe.
Brown, T. G.	Ancaster.
Brush, Geo. H. R.	Owatonna, Minn.
Buchan, T. A.	Drayton.
Buchanan, J.	Brantford.
Buchanan, D.	Florence.
Buchanan, C. W.	Florence.
Butler, G. E.	Witham, Eng.
Caesar, L.	O. A. C., Guelph.
Calvert, E. W.	Reaboro.
Campbel, J. A.	Simcoe.
Campbell, M. A.	Zimmerman.
Campbell, R. D.	Hamilton.
Carroll, J. A.	Cowal.
Chessor, W.	Eglinton.
Clapp, A. W.	Turnerville.
Clark, G. H.	Ottawa.
Clark, G. A.	Poole.
Clark, T. O.	Irma, Alta.
Clemens, R. H.	Galt.
Clement, F. M.	Dutton.
Coben, Henry	Kinmount.
Coglon, R. B.	Coutts, Alta.
Cohoe, D. P.	New Durham.
Coke, J.	Erin.
Coleman, H. W.	Inkermann.
Cormie, G. N.	Fergus.
Craig, A. J.	North Gower.
Crawford, S.	Ruthven.
Creelman, G. C.	O. A. C., Guelph.
Crow, J. W.	O. A. C., Guelph.
Curran, G. B.	Magnet, Man.
Cutting, A. B.	Toronto.
Davies, E.	Brantford.
Davis, L. M.	St. Mary's.
Dawson, W.	Vars.
Day, W. H.	O. A. C., Guelph.
Day, G E.	O. A. C., Guelph.
Dempsey, P. C.	Trenton.
Dennis, Jas. R.	Weston.
Denton, E.	Vancouver, B.C.
Derrick, A. A.	Summerland, B.C.
Dorrance, H. A.	Orangeville.
Duff, H. C.	Markdale.
Duff, J. C.	Desboro.
Duncan, R. S.	Port Hope.
Duncan, C. C.	Jordan Harbor.
Dunning, H. L.	Thornton
Dyer, W. D.	Columbus.
Eastham, J. W.	C. E. F., Ottawa.
Edwards, S. F.	O. A. C., Guelph.
Elton, C.	Cowley, Alta.
Emmett, A. J.	Southend.
Fairbairn, J. B.	Vineland.
Farmer, P. P.	Toronto.
Farmer, G. H.	Steelton.
Ferguson, Jas.	Dalmeny.
Fleming, A.	Kilsyth.
Forsyth, F.	O. A. C., Guelph.
Fowler, R. A.	Morefield.
Foyston, B. E.	Minesing.
Francis, J. F.	O. A. C., Guelph.
Fraser, W. J.	Revelstoke, B.C.
Freeborne, S. G.	Magnetawan.
Fretz, R. C.	Jordan Harbor.
Fulmer, H. L.	O. A. C., Guelph.
Galbraith, A. J.	Toronto.
Gallaugher, Sam.	Rosemont.
Gandier, S. H.	O. A. C., Guelph.
Gardiner, J. F.	McKellar.
Garrett, G. L.	Grimsby.
Gerow, H. B.	Guelph.
Gibson, A. L.	O. A. C., Guelph.
Gifford, F. E.	Kamloops, B.C.
Goodchild, Andrew	Craiglieth.
Gordon, A. L.	Vernon, B.C.
Graesser, F.	Guelph.
Graham, R. R.	O. A. C., Guelph.
Graham, W. R.	O. A. C., Guelph.
Graham, C. M.	Newton Robinson.
Grange, J. B.	Toronto.
Grant, R. H.	Hazeldean.
Gravely, C. H.	Mt. Forest.
Groh, H.	Preston.
Gunn, R. E.	Beaverton.
Hales, J. P.	Guelph.
Halliday, D. C.	Port Credit.
Hallowes, W. E.	O. A. C., Guelph.
Hamer, R. S.	Perth.

Name.	Address.
Hamilton, A. G.	Guelph.
Hankinson, L. D.	Grovesend.
Harcourt, Jno.	St. Anns.
Harcourt, R.	O. A. C., Guelph.
Hardie, J. C.	Listowel.
Harding, P. S. D.	Lacombe, Alta.
Hare, J. H.	Whitby.
Hare, H. R.	Grafton.
Harries, J. F.	Cardinal.
Hay, J. M.	Talbot, Alta.
Haydon, R. E. B.	Kamloops, B.C.
Hayes, W. H.	St. John, N.B.
Henderson, I. B.	Hampden.
Henry, G. S.	Oriole.
Henry, L. B.	Winona.
Herner, M. C.	O. A. C., Guelph.
Heurtley, E. W.	Woking, Eng.
Hextall, L. J.	Calgary, Alta.
Hiddleston, J. S.	Brantford.
Hill, W. R.	Port Credit.
Hill-Tout, W. S.	Abbotsford, B.C.
Hipple, L. E.	Beamsville.
Hirst, G. S.	O. A. C., Guelph.
Hood, E. G.	Hagerman.
Hopkins, S. H.	O. A. C., Guelph.
Hopkins, E. S.	Norwood.
Hotson, W. B.	Avonbank.
Hotson, J.	Avonton.
Howell, J. S.	Jerseyville.
Howes, E. A.	Ottawa.
Howitt, J. E.	O. A. C., Guelph.
Hunt, Wm.	O. A. C., Guelph.
Hurndall, I.	Paris.
Hutchinson, A.	Wolseley, Sask.
Hutt, H. L.	O. A. C., Guelph.
Irvine, D.	Habermehl.
Isaacs, W. O.	Bofur, Jamaica.
Iwanami, J.	O. A. C., Guelph.
Jack, Jas.	Glenmorris.
Jackson, W. D.	Carp.
Jackson, G.	Guelph.
Jarvis, G. L.	Grimsby.
Jeffrey, W. N.	Stratford.
Jenkins, G. J.	Todmorden.
Jones, D. H.	O. A. C., Guelph.
Jowsey, H. B.	Toronto.
Kedey, W. M.	Fitzroy Harbor.
Kelleher, M.	O. A. C., Guelph.
Kennedy, S.	Apple Hill.
Kerr, Wm.	Stirling.
Kingsmill, G. F.	London.
Kitchen, A. F.	St. George.
Klinck, C. R.	O. A. C., Guelph.
Knapp, J. S.	Merrickville.
Kyono, J.	Southampton, N.Y.
Laidlaw, C. M.	Henfryn.
Laird, J. O.	Blenheim.
Laird, Geo.	Cedar Rapids, Iowa.
Landels, B. H.	Truro, N.S.
Lattimer, E.	Burford.
Leith, F. W.	Lansdowne.
Lennox, W. J.	Newton Robinson.
Leppan, H. D.	O. A. C., Guelph.
Lever, J.	Sandhill.
Lick, E.	Oshawa.
LeLacheur, G.	Macdonald College, Que.
Lindesay, H. H.	Ottawa.
Lindsay, J. E.	Lochwinnoch.
Lindsay, J. E., Jr.	Lochwinnoch.
Logsdail, A. J.	Jordan Harbor.
Longley, W. V.	Paradise, N.S.
Macdonald, G. C.	Chatsworth.
Main, C.	Sheffield.
Marcellus, F. N.	North Winchester.
March, Henry	Cowichan Lake, B.C.
Martin N. R.	Corinth.
Mason, A. W.	O. A. C., Guelph.
Metcalf, I. F.	Toronto.
Miles, A. F.	Creemore.
Millen, F. E.	O. A. C., Guelph.
Miller, H. H.	Chicago, Ill.
Miller, Henry	Arrow Park, B.C.
Mills, P. G.	Ellison, B.C.
Monk, B. F.	Springford.
Monkman, R. K.	Rosetown, Sask.
Monteith, Hon. N.	Stratford.
Mooney, Jno. A.	Regina, Sask.
Moore, J. A.	Islington.
Moorehouse, R. C.	Cairo.
More, Jas.	Kirkton.
Morewood, J. R.	Quebec, Que.
Moseley, L. A.	Bayfield.
Murray, R. H.	Avening, Ont.
McArthur, M.	Wiste, Alta.
McCall, G. W.	Fort William.
McCallum, J. M.	Shakespeare.
McCarthy, D. P.	Kingston.
McClennan, A. H.	O. A. C., Guelph.
McConkey, O.	Cayley, Alta.
McCormick, J. H.	Appleby.
MacRae, D. E.	Cumberland.
McCready, S. B.	O. A. C., Guelph.
McCulloch, A. C.	Epsom.
MacDonald, J. C.	Montreal, Que.
McDonald, R.	O. A. C., Guelph.
McGill, H. W.	Everett.
McPherson, Miss T.	Tupperville.
McGregor, J. H.	Desboro.
McIlquham, J. M.	Lanark.
McIntosh, A. D.	Stirling.
McKay, W. J.	Ripley.
McKay, A.	O. A. C., Guelph.
MacKay, N. C.	Scotsburn, N.S.
McKee, D.	DesMoines, Iowa.
McKee, C.	Duntroon.
McKillican, C. C.	Vankleek Hill.
McLaurin, A. E.	Watson, Sask.
McLennan, D. M.	Lancaster.
McMillan, A.	Dutton.
McRostie, G. P.	Metcalfe.
McTaggart, A.	O. A. C., Guelph.
MacVannel, A. P.	Picton.
Nairn, Jno.	Hamiota, Man.
Nash, J. F.	Windsor.
Neale, A. R.	Willow Point, B.C.
Neelands, C. F.	Cobalt.
Neff, E. F.	Hamilton.
Nesbitt, E.	Woodstock.
Nicholson, C.	Guelph.
Nixon, C. C.	Peterboro.
Nixon, D. C.	Toronto.
Nixon, W. G.	Sault Ste. Marie.
Noble, J. W.	Horning's Mills.

Name.	Address.
Northcott, S. A.	Taunton.
Nourse, C. B.	O. A. C., Guelph.
Ostrom, H.	Eriksland, Sweden.
Packard, E. W.	Toronto.
Packard, R. C.	Toronto.
Palmer, E. B.	Norwich.
Patterson, F. C.	Ellesmere.
Penna, L. T.	Para, Brazil.
Pettit, M.	O. A. C., Guelph.
Picken, B.	Montreal, Que.
Pickett, C. H.	Vittoria.
Pilkey, D.	La Vallee.
Porter, W. H.	Petrolia.
Putnam, G. A.	Toronto.
Rayney, N. A.	Weston.
Raynor, T. J.	Ottawa.
Reed, F. H.	Regina, Sask.
Reek, W. R	Toronto.
Reid, Peter	Chateauguay Basin, Que.
Reid, H.	O. A. C., Guelph.
Reilly, E. E.	Shanly.
Revell, H. K.	O. A. C., Guelph.
Reynolds, R.	Scarboro.
Riley, Jas. J., Jr.	Graham, Que.
Ringland, H. S.	O. A. C., Guelph.
Robertson, Geo. A.	St. Catharines.
Robertson, W. H.	Walhachin, B.C.
Robinson, J. D.	Washington, D.C.
Robinson, E.	O. A. C., Guelph.
Roedding, E.	Alsfeldt.
Ross, Jas. G.	Montreal, Que.
Russell, F. H.	Lethbridge, Alta.
Rutherford, R. L.	River Hebert, N.S.
Salkeld, D. G.	Goderich.
Salkeld, T. G.	Goderich.
Sampson, Sam. J.	Tavistock.
Sanders, G. E.	Round Hill, N.S.
Sanderson, T.	Byron.
Schuyler, R.	Jarvis.
Scott, W. R. M.	Brampton.
Shantz, Allen	Waterloo.
Shantz, A. J.	Hespeler.
Shaver, F. D.	O. A. C., Guelph.
Shepherd, W. F.	Bridgeport.
Shibley, C. S.	Harrowsmith.
Shorthill, R. J. R.	Belleville.
Shuh, C. L.	Waterloo.
Sibbald, W. M., Jr.	Sutton West.
Singleton, W. S.	Soperton.
Sirett, A. W.	Rosseau.
Sirett, H.	Ottawa.
Sloan, R. R.	Blyth.
Smith, R. H.	Yellow Grass, Sask.
Smith, M.	Palmerston.
Smith, R. M.	Oakville.
Smith, C. T.	Mt. Elgin.
Smith, J. E.	Simcoe.
Smye, Geo. C.	Ayr.
Sorley, J. N.	Cummings Bridge.
Spalteholz, G. W.	Coquitlam, B.C.
Spencer, J. B.	Ottawa.
Springer, S.	O. A. C., Guelph.
Spry, J.	O. A. C., Guelph.
Squirrell, W. J.	O. A. C., Guelph.
Staples, S. S.	Ida.
Stark, J. H.	Lang.
Stark, J. W.	Chatham.
Steckley, J. C.	Essex.
Stevenson, L.	Ancaster.
Stewart, A.	Strath Gartney, P.E.I.
Stinson, L. A.	Chicago, Ill.
Stratton, R. W.	Guelph.
Strong, W. F.	Hilton.
Taylor, G. S.	Arnprior.
Teece, J. H.	Enderby, B.C.
Tennant, J. L.	Falkland.
Thompson, S.	Coutts, Alta.
Thomson, R. G.	Winnipeg, Man.
Thorpe, G. G.	Guelph.
Tipper, R. M.	Ashworth.
Tisdale, W. H. J.	Paris.
Todd, S. E.	Petrolia.
Toole, A. A.	Mt. Albert.
Toole, W.	London.
Travers, J. R.	Talbotville.
Tregillus, C. A.	Calgary, Alta.
Tufford, L.	Beamsville.
Twigg, C. B.	Wichita, Kansas.
Underhill, M. J.	Brantford.
Vance, Victor	Forest.
Van Sickle, P. O.	Trinity.
Vining, R. L.	Thorndale.
Wade, R. W.	O. A. C., Guelph.
Walker, F. T.	Haysville.
Wallace, G. M.	Kars.
Wardlaw, C. E.	Brampton.
Waterhouse, F.	O. A. C., Guelph.
Webber, F.	Peterboro.
Weber, M.	Winterbourne.
Webster, H. B.	Science Hill.
Weir, E. A.	Randwick.
Wells, E. A.	Chilliwack, B.C.
Westover, C. A.	Frelighsburg, Que.
Whale, I. B.	Goldstone.
Whaley, E. A.	Brownsville.
Wheaton, R.	Thorndale.
Wheeler, H. C.	Urbana, Ill.
White, E. W.	New Westminster, B.C.
Whiteside, A. E.	O. A. C., Guelph.
Wiancko, T. A.	Sardis, B.C.
Widdifield, J. W.	Uxbridge.
Wilkinson, P. J.	Cambray.
Wilkinson, E. G.	Lindsay.
Wills, H. A.	Winger.
Wilson, S.	Rolling Dam, N.B.
Wilson, J. Lockie	Toronto.
Woltz., G. L.	Brantford.
Wright, W. H.	Delaware.
Zavitz, C. A.	O. A. C., Guelph.
Zavitz, E. J.	O. A. C., Guelph.
Zavitz, R. W.	O. A. C., Guelph.

OFFICERS FOR 1911.

President .....W. J. Lennox, Newton Robinson, Ont.
Vice-President .....Fred. W. Goble, Woodstock, Ont.
Secretary and Editor .....C. A. Zavitz, Agricultural College, Guelph.
Assistant Secretary .....W. J. Squirrell, Agricultural College, Guelph.
Treasurer .....H. L. Hutt, Agricultural College, Guelph.
Directors .....G. C. Creelman, R. L. Moorhouse, J. H. Hare, Nelson Monteith, G. B. McCalla, W. Dawson.
Auditors .....A. W. Mason and R. R. Graham.

Committees on Experimental Work.

Agriculture .....Prof. C. A. Zavitz (Director), W. J. Squirrell, A. W. Mason and A. E. Whiteside.
Fruit Growing .....Prof. J. W. Crow (Director), Adam Harkness and Geo. Robertson.
Vegetable Growing .....A. H. McLennan (Director), Geo. McCalla and A. J. Logsdail.
Poultry Raising .....Prof. W. R. Graham (Director), P. E. Angle, J. H. Hare and H. C. Duff.
Bee Keeping .....Morley Pettit (Director), L. J. Hextall and R. C. Fretz.
Forestry .....Prof. E. J. Zavitz Director) H. R. McMillan and E. C. Drury.
Agricultural Chemistry .....Prof. R. Harcourt (Director), J. W. Crow and W. McCalla.
Schools .....S. B. McCready (Chairman), H. L. Hutt (Secretary), C. A. Zavitz, E. J. Zavitz, E. A. Howes and E. Robinson.

Committee on the Prevention of the Importation and the Distribution of Noxious Weed Seeds in Screenings.
Profs. R. Harcourt, C. A. Zavitz, G. E. Day and S. B. McCready.

TREASURER'S REPORT, 1910.

Receipts.		Expenditures.	
Balance from last year	$743 75	Agricultural experiments	$1,663 66
Membership fees, 403 at 50c. ...	201 50	School garden extension work..	458 75
Government grant	2,750 00	Fertilizer experiments	50 05
		Apicultural Experiments	105 85
Total	$3,695 25	Reporting Annual Meeting, 1909	48 00
		Expenses Annual Meeting, 1911	118 50
		Total	$2,444 81
		Balance on hand	1,250 44
			$3,695 25

We, the undersigned auditors, declare that we have examined the Treasurer's accounts and found them correct.

J. B. Fairbairn,
W. J. Squirrell,
Auditors.

January 9th, 1911.

Ontario Agricultural and Experimental Union.

ANNUAL MEETING.

The thirty-second annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Tuesday, Wednesday and Thursday, January 10th, 11th and 12th, 1911. There were in all six sessions. Besides these, there was a reception given for the ex-students of the College on Monday evening, January 9th, at the home of Dr. and Mrs. Creelman, to which the College officers were invited. On Wednesday evening those in attendance at the Experimental Union meeting were invited to the students' Annual Speaking Contest, which was held in the College Gymnasium. The reports and addresses which were presented, and the most important discussions which took place during the various sessions of the Experimental Union meeting, are embodied in this report.

SECRETARY'S REPORT.

C. A. Zavitz, Professor of Field Husbandry, O. A. C., Guelph.

In 1910 the co-operative work was conducted throughout Ontario in agriculture, horticulture, forestry, bee-keeping, agricultural chemistry, and, in connection with the Public Schools, in elementary agriculture, horticulture and forestry.

Although the co-operative work had a small beginning and was at first confined to the testing of a few crops and fertilizers, it has increased until it now includes thousands of experimenters. From time to time, new lines of activity have been added, until many branches of agriculture have been included in the system. The following gives the year in which the co-operative work in the various departments was started:

1.	Agriculture	1886	7.	Economic Botany	1893
2.	Horticulture	1888	8.	Soil Physics	1897
3.	Dairy Husbandry	1889	9.	Poultry Raising	1899
4.	Apiculture	1889	10.	Forestry	1901
5.	Live Stock	1890	11.	Agricultural Chemistry	1904
6.	Economic Entomology	1892	12.	Rural School Gardens	1908

Under six of these heads work has been conducted continuously since it was first started. In the other branches it has been somewhat irregular, owing to various reasons.

The co-operative work in agriculture has been conducted for a longer time than that of any other department. There have been 58,812 distinct tests made throughout the Province since the work was started twenty-five years ago. Each of these tests consisted of from two to ten plots. The increase in the number of experimenters in agriculture can be seen from the following figures, which show the average yearly number actually engaged in the work in each of the five-year periods during the last quarter of a century:

1886 to 1890	71
1891 to 1895	1,060
1896 to 1900	2,992
1901 to 1905	3,379
1906 to 1910	4,278

It will therefore be seen that during the last five years the co-operative experiments in agriculture have been conducted annually on an average of 4,278 farms, the greatest number in any one year being 4,856.

About 30,000 copies of the Annual Report of the Experimental Union for 1909 were printed and distributed by the Ontario Department of Agriculture in the early part of the past year. Besides this wide distribution of the reports of experiments, we are pleased with the interest which has been taken in our Union meetings by the editors of the agricultural journals, and by the editors of the agricultural departments of several of our leading newspapers in Ontario, and even in some of the other provinces.

I wish to draw particular attention to the excellent work which the experimenters are accomplishing, not only for themselves but also for the agriculture of our Province. Besides the associates and the graduates of the College who are now farming in Ontario and are taking a deep interest in the work of the Experimental Union, we are pleased to state that a large number of leading and influential farmers of Ontario, who never had the opportunity of attending an agricultural college, are also doing most commendable work. Several hundred of these experimenters have conducted co-operative work successfully on their own farms in each of at least five years, and are therefore specially trained for even better work in the future.

It has been my privilege to be directly and intimately associated with the co-operative work of the Experimental Union since its start in 1886. From what I have been able to observe from experience as a practical farmer, from a study of agricultural conditions, from my connection with the Ontario Agricultural College for over a quarter of a century, and from visits to over one hundred agricultural colleges and experiment stations in different parts of Europe, the United States, and Canada, I am convinced, and thoroughly convinced, that valuable results can be obtained from co-operative experimental work, which cannot possibly be secured in any other way. I commend this system of co-operation as one of the most important lines of extension work which can be carried on in any agricultural country.

PRESIDENT'S ADDRESS.

G. S. Henry, Oriole.

Allow me to welcome you to our annual gathering. We all, from Prof. Zavitz down, remember former meetings, the memories of which still linger with us, giving fresh impetus to our labors for the cause of a bigger, brighter and better agriculture. I trust that the convention now gathering will be the peer of any of its predecessors. We have a large and comprehensive programme. If we all enter into the meetings to receive all there is from them, there is no reason why we may not make the gathering of 1911 a memorable one. It will be necessary, to get the best results for the audience, to help the speakers by an undivided attention, followed by pointed questions and relevant discussion.

We naturally desire a good big audience, and this year we have every expectation of our wishes along this line being gratified. There are no examinations in

the immediate future to haunt the students, and there is no fat stock show, no horse show, and no lecture-room, calling us all down to the city.

We are glad to welcome the ex-students back to their alma mater, and trust that this visit will be both pleasant and profitable. It is good for us to meet old friends and renew acquaintances. It brightens life, relieves the drudgery and monotony of every-day toil. It takes us back to former days, when things looked brighter and our anticipations were of the best. We are nevertheless conscious that it can never be the same as in our own students days, because new classes fill the rooms, new faces fill the halls, and everything reminds us that time has moved us on and that our sphere is in the broad field of life. At the same time I feel that we are all students still, the former students merely continuing our course, begun here, in the bigger school of practical experience. In this school of practice we are forced to depend more upon our own resources, and have not the guiding hands, as you the present students have, of a large staff of professors. Further, we have the double field of learning and teaching.

And this leads me to another thought which I give you in the form of a question. Are we making the best use of our advantages, experience and training in our county and district? Are we conscious of the power we are able to exert upon the agriculture of our Province? Do we realize that the hope of a greater agriculture in Ontario is in us? Our part of the work does not end by petitioning the Minister of Agriculture for a county representative. We are glad to see that the government is extending this phase of the work, but the greatest results can only be obtained by one and all of us getting out in front and leading our sections to improvements in all directions. The College can only touch the fringe of our population; it is for us to act as the leaders in our own neighborhood.

The recent high prices for foodstuffs has set the urban population thinking, and much of late has been said in the press regarding the decrease in the agricultural population in Ontario, and the consequent decrease in production of farm products. We are all conscious of the tendency of population to move towards the cities. And we all feel the evil effects, but have we considered the causes and looked for the remedies?

Of course we all realize that with the introduction of reapers, mowers and other so-called labor-saving devices, much of the labor formerly used on the farm is now employed in the workshop, thereby working indirectly in agricultural production. This, however, under modern ideas of civilization may be termed legitimate and proper. Then there is the migration to the Western Provinces, to which we, as good loyal Canadians, never think of objecting. This is, however, perhaps the greatest cause of the decrease of the rural population in Ontario during the last decade or so. But there are many other causes, which are working in more insidious ways against agricultural development at the present time which it may be possible to counteract by applying the proper remedies.

In the next place, our school system seems open to criticism. It is often charged that the Public and High Schools are both educating the boys off the farm. Has there not been a tendency to over-estimate the value of mental effort, and to under-estimate the value of physical labor? Has there not been a feeling that John is too clever to remain on the farm? Have we not all heard of father and mother toiling and sacrificing themselves to put John through College and help him enter professional life, believing that his life would be wasted on the farm? Has there not been a feeling that the farm required only the physical effort, and that the clever boy should be employed in the mental effort only? We all know this is true, and perhaps in former times there was much reason for

such a theory. But have not things changed? Do we not need the brains on the farm as much as anywhere? I trust we realize the change that has taken place, and are ready to do our part to encourage the boys to stick to rural life.

But there is another sense in which the boys have been educated off the farm. The courses of study in our schools have had a tendency to give the boys a liking for city life, and have bred in them the ambition to leave the quiet and industry of the farm for the noise and rush of the city. To the lay mind the remedies seem plain. Remodel the courses in the rural schools, give the boys more physical training, have the schools teach the beauty of nature, give to the young mind an understanding of the different forms of life with which he is surrounded. Have the school gardens started as object lessons, and in a general way have all study tend to give a fondness for rural life. Coupled with these different studies the best literature should be taught so that the mature mind would have a liking for reading and communion with the great minds of all time. But you will say how are these remedies to be applied? In the first instance, the rural public and the public generally must be educated to spend more money on education. The recent changes and increased grants by the department of Education seem to have been approved by the public, and what is now needed is the intimation from the people that more should be done and the government will readily take action. What has just been said refers more especially to the Public Schools, the only school that the vast majority of our rural population ever have the chance to attend. Nevertheless, our aim should be to provide more special secondary schools for the agricultural population. We should have many colleges, such as our own here in Guelph, at different centres in the Province.

Of course we are not forgetful of the fact that the present cry of back to the farm is largely raised by the city people. And these are not speaking from altruistic motives alone. Their provisions have been costing them more of late and they think, and rightly, too, that production has fallen off because of lack of labor. They forget that the cost of the manufactured article which the farmer must use has greatly increased, and after all he is fully entitled to what he is receiving for his produce. There seems to be a feeling that it is the province of the farmer to produce an abundance of foodstuffs and sell them cheap to my lord, the city man, no matter if the farmer makes ends meet or not. It seems to me that we have been, generally, hewers of wood and drawers of water to those in the cities, and now that we have come into our own they cannot understand the change and so feel hit. And have we not been partly responsible for our position in the past? Have we not acquiesced and quietly submitted? It is necessary for farmers to stand together and assert our rights. It has been said that the dignity of a calling is its utility. Then why do we not realize the dignity of our calling and show the public where we stand? After all, much of the tendency city-wards is caused by public opinion. And what is this fickle dame saying of rural life? Simply that it is inferior to that in the centres of population.

Now, it is for us to raise the standard of our production. It is for us to show our farmers that the work we do co-operatively and that done here by Prof. Zavitz and those of the other departments is only a means to an end. We must produce more fodder for our live stock. Ontario is a stock country and we must cease to consider grain growing as the end of our labors. In this way we shall raise the standard of life in rural Ontario, and in conjunction with rural mail delivery, the telephone, good roads, electric railways, electric power and other such modern improvements will transform our life and make us not only the peer but the superior of our city cousins.

W. J. Lennox: Like the President, I am very much pleased to see so many students here this morning. At the September meeting of the Executive at the Canadian National we decided to change these union meetings to January, as the Fat Stock Show and agricultural meetings connected therewith made the time very full during the one week in December, and allowed insufficient time for the annual meeting of the Experimental Union. We have had a great deal of material prepared here from time to time by the different professors and we were anxious to have large meetings and a good opportunity for the presentation of this material and discussion by those present. Now, we are pleased to see so many here this morning, and I hope that we will have still more before long. When the President spoke of the ex-students, I felt a responsibility, such a responsibility that I have never felt before. It seems to me, Mr. President, that the welfare of this College depends largely upon the ex-student body. I am sorry to note that there are not more of the ex-students of this College present with us. Many of us feel, when we are working on our farms, that we are few among so many farmers, and therefore our responsibility is the greater in upholding the reputation of this Institution. The different agricultural representatives who are located through the country are doing a great work. I find our county representative at Collingwood is accomplishing work which could not be accomplished by the Agricultural College. These agricultural representatives are reaching the farmers in a way that the Agricultural College could not reach them.

The President spoke of the school system. We have not an efficient school system for our country. I was surprised to find at one of our school meetings in December that very little nature study was taught in our schools, in fact but very little was taught that would help the farm boy or girl to become more interested in agriculture. Our President also spoke of the farmers standing together. We find that, even with the influences we have about us, our farmers do not co-operate as they should. We have been greatly interested in the last few years in Farmers' Institute work, but sometimes we find it very difficult to secure large attendances, to get those farmers who should be the most interested to come out to the meetings and to benefit by them as we would expect them to. We have been trying in every way to make the meetings interesting, to have good speakers, and to have the farmers benefit by such meetings. I find sometimes, in my capacity as secretary of our Institute, that we have speakers who do not give satisfaction simply because they speak on some subject in which our farmers are not interested. There seems to be a great difficulty in getting speakers from the department who are suitable to our locality. If we could find some method of overcoming this, I think we would get more farmers out, get them more interested, and obtain better results from such meetings.

Prof. C. A. Zavitz: Just a word to supplement what has already been said before anyone else speaks on this question in reference to the ex-students of the college who are not farmers. While it is true that the number of ex-students of the institution who are on farms is comparatively small in comparison with the great number of farmers in the Province of Ontario, at the same time I think we have reason to be congratulated, as ex-students of this institution, on having such a very large percentage of ex-students actually farming in this Province. All the Short Course students return to the farm. Practically all of the students who take the Two Years' Course and who take their diplomas, return to the farm, and quite a percentage of those who take the Four Years' Course and secure their degrees also return to the farm. A few years ago I investigated the records of this institution for twenty-five years, going into the matter carefully, noting the occu-

pations and addresses of the ex-students, and I found that of the students who had been at the Ontario Agricultural College in the regular course, that more than half of them were located in Ontario. Of these, no less than seventy-one per cent. were farmers, not being merely connected with agriculture, but were actively engaged in practical farming on the land. In making this summary, we did not include men connected with agricultural journals or colleges, or Farmers' Institute workers; we did not include any person connected with agriculture unless that person was actually working on the land. I noticed a newspaper item not long ago referring to the occupations of the graduates of Yale University, and of all those who had gone through Yale University only two per cent. were in any way connected with agriculture. In comparison with this, we have from the Ontario Agricultural College over seventy per cent. of the ex-students who are actually connected with farming. Naturally, a number of our ex-students are engaged in other kinds of work, but a large percentage and a very favorable percentage are located here on the farms of Ontario.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN AGRICULTURE.

C. A. Zavitz, Professor of Field Husbandry, and W. J. Squirrell, Lecturer in Field Husbandry, O. A. C., Guelph.

One of the main objects of the co-operative Experimental work in Ontario is to help the farmer to help himself. Its aim is to encourage the farmers of all classes to do better work for themselves and for others than they have been doing in the past. It endeavors to give men a deeper interest in farming, a higher opinion of their occupation, a greater appreciation of their responsibilities, an opportunity for making more money, and the means by which they can take a more prominent part in the progress and development of their country. The co-operative experimental work is under the direct supervision of the Ontario Agricultural and Experimental Union, and is greatly assisted by the Ontario Agricultural College. The great bulk of the co-operative experiments have been conducted by the farmers themselves upon their own farms. Officers and members of Farmers' Institutes and also of Farmers' Clubs, in some instances, have united in carrying out a number of co-operative tests in connection with their local organizations. Some of the Public School Inspectors have encouraged this work in their various school sections, either in the school grounds or at the homes of the pupils living in close proximity to the school buildings. Nearly all of the agricultural representatives located in fourteen counties throughout Ontario, have carried on quite extensive work according to the instructions and with the material furnished by the Experimental Union.

The Experimental Union opens up a channel through which some of the best material of the Experiment Station can be brought to the homes of the farmers. It makes direct application of the information gained at the college by having experiments conducted on hundreds and even thousands of farms, and it systematizes the co-operative work in such a way that the results of those experiments which have been conducted with care and accuracy can be summarized and made into valuable reports for the guidance of farmers generally. It introduces improved methods of farming along various lines. It combines, in an admirable way, the training of the hands and the training of the intellect. It is therefore not only a source of practical gain in dollars and cents to the farmers, but it is a great educational

feature which has had a very wholesome influence, not only on the agriculture of the Province, but also on the agriculturists themselves.

For the co-operative work which is being carried on throughout Ontario, the results of experiments and investigations obtained at the Agricultural College, form the basis of both the methods of operation and the materials selected. Close attention has been given to the methods of conducting experiments, and printed instructions for conducting the tests, along with blank forms on which to report the results, have been forwarded to every person undertaking the work. From the beginning, the co-operative experimental work of the Union has been directed and controlled by circulars and letters, printed and written, which have been transmitted through the mails. Personal letters have frequently been sent to give encouragement and advice. When special visits have been made to the experimenters, the object has been to enable the director to study the difficulties of those actually engaged in the work and thus to be in a better position to know the best methods to adopt in the printed instructions rather than to take any part in the immediate control of the practical operations of the experiments. We believe that this is a wise move, as it places the men upon their honor and tends to bring out the best that is in them. Every man is made responsible for his own experiments and is urged to do the very best he can for himself, for his neighbors, for the Experimental Union, and for the country. A pleasing feature in connection with this work is the fact that many persons, who at first took but little interest in the experiments, have afterwards proven themselves to be most valuable experimenters and have shown great care and accuracy in the details of their work. Great care is exercised in planning the various co-operative experiments in such a way that they can be successfully undertaken by the people who are to be benefited thereby. Some experiments are comparatively simple and some are more complicated, but in every case the work is made as clear of comprehension, as definite of purpose, and as simple in method of operation as is consistent with the objects in view. It has been the constant aim to make all experiments as interesting and as instructive as it is possible to make them.

There were in all, thirty-nine separate and distinct lines of co-operative experiments in agriculture conducted throughout Ontario during the present year. These included spring and fall grains, root crops, forage, fodder, silage and hay crops, culinary crops, the growing of grains, grasses and clovers in different combinations the application of commercial fertilizers, farmyard manures, etc. Most of the plots were one rod wide by two rods long, being exactly one-eightieth of an acre in size. Formerly, some of the plots were considerably larger, a few being as large as one-half of an acre, but these gave less satisfaction than the smaller plots. It is very difficult indeed for the experimenters to give the accurate weights of the crops produced on large sized plots. With the smaller plots, experiments can be kept more completely under control, and more definite results can be obtained.

At the College, the early part of the autumn of 1909 was comparatively dry, the winter was about normal, the greater part of March and of April of the year 1910 was very fine, May was cold and backward, June was pleasant with but few showers, and July was somewhat warm and comparatively dry. From the Crop Bulletin issued by the Bureau of Industries of the Ontario Department of Agriculture for 1910, I make the following quotation:

"The rainfall for the five months (March-July) was 12.10 inches or 5.26 inches below the average for twenty-eight years. April and July were above normal, being in excess 1.02 and 0.80 inches respectively, while the others ranged from 0.17 to 1.40 inches below."

The following gives the list of co-operative experiments in agriculture conducted throughout Ontario in 1910:

LIST OF EXPERIMENTS FOR 1910.

	Plots.
Grain Crops.	
1 —Testing three varieties of Oats	3
2*a*—Testing three varieties of six-rowed Barley	3
2*b*—Testing two varieties of two-rowed Barley	2
3 —Testing two varieties of Hulless Barley	2
4 —Testing two varieties of Spring Wheat	2
5 —Testing two varieties of Buckwheat	2
6 —Testing two varieties of Field Peas	2
7 —Testing Emmer and Spelt	2
8 —Testing two varieties of Soy, Soja, or Japanese Beans	2
9 —Testing three varieties of Husking Corn	3
Root Crops.	
10 —Testing three varieties of Mangels	3
11 —Testing two varieties of Sugar Beets for feeding purposes	2
12 —Testing three varieties of Swedish Turnips	3
13 —Testing two varieties of Fall Turnips	2
14 —Testing two varieties of Carrots	2
Forage, Fodder, Silage and Hay Crops.	
15 —Testing three varieties of Fodder and Silage Corn	3
16 —Testing three varieties of Millet	3
17 —Testing two varieties of Sorghum	2
18 —Tesing Grass Peas and two varieties of Vetches	3
19 —Testing Rape, Kale and Field Cabbage	3
20 —Testing three varieties of Clover	3
21 —Testing two varieties Alfalfa (Lucerne)	2
22 —Testing four varieties of Grasses	4
Culinary Crops.	
23 —Testing three varieties of Field Beans	3
24 —Testing three varieties of Sweet Corn	3
Fertilizer Experiments.	
25 —Testing fertilizers with Potatoes	8
26 —Testing fertilizers with Swedish Turnips	6
27 —Testing fertilizers with Barley	10
Miscellaneous Experiments.	
28*a*—Testing two varieties of Early Potatoes	2
28*b*—Testing two varieties of medium ripening potatoes	2
28*c*—Testing two varieties of late potatoes	2
29 —Testing three grain mixtures for grain production	3
30 —Testing three grain mixtures for Fodder production	3
Autumn Sown Crops.	
31 —Testing three leading varieties of Winter Wheat	3
32 —Testing two leading varieties of Winter Rye	2
33 —Testing five fertilizers with Winter Wheat	6
34 —Testing Autumn and Spring Applications of Nitrate of Soda and Common Salt with Winter Wheat	5
35 —Testing Winter Emmer and Winter Barley	2
36 —Testing Hairy Vetches and Winter Rye as Fodder Crops	2

Reports of the co-operative tests which were received during the past autumn have been very carefully examined. For the following summary only the results given in those reports which were complete in essential features and showed carefulness and reliability throughout were used. Many of these reports have been sent in by men who have had a large amount of practical experience on the farm, have had the advantages of a good education, and have had a special training in experimental work as they have conducted successful tests on their own farms in each of several years in the past. It should be remembered, however, that while only the good reports of carefully conducted experiments have been used for publication, many of those not included in the summary show that the individual experimenters must have obtained considerable amount of value from the work. It frequently happens that, owing to some unavoidable accident, the experiment may have been injured to some extent, so that the results could not be used in the general summary, and yet the experiment may have furnished useful lessons to the farmer conducting it. In all cases, experimenters obtain much more information from the work which they conduct than can be given in a tabulated report.

In the carefully prepared instructions for conducting the co-operative work which were furnished each experimenter, a request was made for the experimenter to give his decision as to the relative standing of the different varieties, mixtures, methods of cultivation or fertilizers, when everything was taken into consideration. The summary of the answers to this line of inquiry is presented in the tabulated results under the heading of comparative value.

Grain Crops.

Of the cultivated land of Ontario, nearly one-half is used annually for the production of grain crops. Not only have the cereals occupied an important place in the field experiments at the Ontario Agricultural College in past years, but they have also received particular attention in connection with the co-operative experiments throughout Ontario. A number of the leading varieties of grains which are now grown extensively throughout the Province were first introduced and tested at the Ontario Agricultural College, and were afterwards distributed for the co-operative tests in connection with the Experimental Union. From these small lots of those varieties which proved the most successful, increases were soon made and later seed was sold from one farm to another until, in many cases, those leading varieties became the most commonly grown grains in the different neighborhoods. Many people are now growing grains which are giving much better results than the old varieties which they had under cultivation some years ago, and do not realize that these improved varieties have been introduced and distributed as here described. A farmer recently made a statement that the College cost a lot of money and that he had never yet obtained five cents' worth of value from the institution. On inquiry, however, it was ascertained inside of two or three minutes that he was growing the Mandscheuri barley with great satisfaction, that he was growing the Black Tartarian oats, which is not a particularly good variety, and that a weed had recently reached his farm through seed grain which he had bought, and that this weed had increased rapidly and was becoming very troublesome. It was at once explained that the Mandscheuri barley, which had been mentioned as giving such good results, had been imported from Russia by the College, and from a very small quantity which was produced on a little plot twenty-one years ago, we now have upwards of a half a million of acres of this barley in Ontario annually. It was also explained that Black Tartarian oats had been surpassed by an average

yield per acre per annum of about twenty bushels by each of three or four other varieties, and that an Ontario farmer who was still growing the Black Tartarian, without even trying some of the other varieties which had been giving so much better results in yield of grain, in freedom from rust, in strength of straw, etc., was not living up to his opportunities. It was also pointed out that the very weed referred to had been illustrated and fully described in a bulletin sent out by the College two or three years previous, and that this bulletin was sent to all the members of Farmers' Institutes in Ontario. This gentleman, however, was not a member of the Farmers' Institute, did not receive the bulletin, was not in a position to know the weed when he first saw it in the field, did not have a handy reference regarding its method of eradication, and is only now awakening to the fact that the weed had become a very troublesome pest on his farm and would require a great deal of expense and labor in its eradication. This gentleman decided at once to take a part in the Experimental Union work; to become more in touch with the Farmers' Institutes and with other organizations through which he might secure valuable assistance. The substance of this short conversation is here rehearsed simply to show two things: first, that a farmer may, unawares to himself, be obtaining advantages from the College and from the Experimental Union in his every day work on the farm; and second, that it is exceedingly foolish for any Ontario farmer not to take advantage of the results of experiments and investigations which are being conducted on his behalf.

The tabulated results here presented give the average of the successfully conducted experiments with grain crops throughout Ontario in 1910. The figures in the column under comparative value are made up from the answers obtained from the experimenters on placing the varieties in order of merit after taking everything into consideration. The yield of straw, as given in the second column, represents the total crop less the amount of grain and therefore includes the chaff with the straw. The yield of grain is given in pounds as well as in bushels per acre in order that the results may be more clearly understood, and that comparisons may be made between the different classes of crops as well as between the varieties of each class. While it is true that the different classes of crops were grown on different farms throughout Ontario, yet as most experiments were conducted in a large number of localities, the complete table enables one to make a fairly good comparison of the yields of the different classes as well as of the different varieties of crops throughout the Province. Owing to the great variation in the weight per measured bushel of the different crops, it is much easier to compare the results in pounds than in bushels per acre.

GRAIN CROPS. 1910.

Experiments.	Varieties.	Comparative Value.	Yield per acre.		
			Straw.	Grain.	Grain.
			Tons.	Bus.	Lbs.
Oats, (75 tests).....	Liberty.....	100	1.39	52.01	1,768
	Siberian.....	86	1.37	50.26	1,709
	Yellow Kherson.....	55	1.10	47.75	1,624
	Daubeney.....	63	1.05	44.11	1,500
Six-rowed Barley and Emmer (28 tests)	O.A.C. No. 21 Barley.....	100	1.53	41.17	1,976
	Emmer.....	60	1.46	.....	1,623
	Success Barley.....	55	1.29	30.30	1,454

GRAIN CROPS—Continued.

Experiments.	Varieties.	Comparative Value.	Yield per acre.		
			Straw.	Grain.	Grain.
			Tons.	Bus.	Lbs.
Two-rowed Barley.. (5 tests)	Hanna	91	1.28	34.58	1,660
	Two-rowed Canadian	100	1.33	29.67	1,424
Hulless Barley..... (13 tests)	Guy Mayle	100	.87	22.11	1,326
	Black Hulless	100	.93	21.75	1,305
Spring Wheat..... (27 tests)	Wild Goose	93	1.49	25.06	1,504
	Red Fife	97	1.59	23.23	1,394
	Hungarian	100	1.44	22.31	1,339
Buckwheat ..... (2 tests)	Rye	100	1.57	20.99	1,008
	Silver Hull	82	2.06	14.65	703
Emmer and Spelt... (13 tests)	Common Emmer	100	1.17	34.34	1,374
	Alstronm Spelt	90	.94	32.86	1,314
Winter Wheat ..... (23 tests)	American Wonder	100	2.19	31.25	1,875
	Imperial Amber	88	2.39	27.80	1,668
	Tasmania Red	82	2.24	27.60	1,656
	No. 5 Red	66	2.68	26.70	1,602
	Crimean Red	59	2.33	26.59	1,595
Winter Rye ..... (4 tests)	Mammoth White	100	1.58	23.04	1,290
	Common	92	1.54	22.14	1,240
Field Peas..... (35 tests)	New Canadian Beauty	100	1.56	26.72	1,603
	Early Britain	88	1.40	25.51	1,530
Field Beans..... (15 tests)	White Wonder	100	.66	21.11	1,266
	New Prize Winner	83	.57	20.57	1,234
	Marrowfat	100	.71	20.23	1,214
Soy Beans ..... (2 tests)	Brown	100	.16	9.00	540
	Early Yellow	100	.40	8.00	480
			Whole Crop.		
Corn for Grain..... (20 tests)	Wisconsin Little Dent	100	4.97	45.16	2,529
	Genesee Valley	93	5.64	40.14	2,248
	King Philip	69	6.25	36.61	2,050

Varieties of Oats. The oat crop in Ontario is an exceedingly important one, as the market value of this crop amounts to from thirty-five to forty million dollars annually. About two hundred and sixty varieties of oats have been under experiment at the Agricultural College within the past twenty-two years. New varieties have been introduced from time to time, and after five years' tests the poorer kinds have been dropped and those which have given the most satisfactory results have been retained in the tests.

From an inquiry made throughout Ontario, in 1910, it was found that the most extensively grown varieties of oats in the Province were the Banner, the Siberian, and the Ligowa, in the order here given. Although nineteen different varieties were mentioned as being the most extensively grown in the different localities, it appears that the three varieties here referred to occupied more land than all the other varieties combined. The Liberty variety of oats, which stands at the head of the list in yield of grain per acre of the four varieties tested throughout Ontario in 1910, possesses a spreading head and white grain of fairly good quality.

Of all the varieties of oats which have been grown at the College, the Liberty is one of the very best in quality of straw. The straw of this variety possesses sufficient elasticity to prevent its becoming badly lodged except in very unusual cases. A heavy storm will sometimes cause it to bend considerably, but very seldom causes the straw to break. The Siberian variety of oats also possesses a spreading head and a white grain. The quality of the straw is not quite equal to that of the Liberty variety. The Siberian was imported by the College from Russia twenty-two years ago and is one of the leading varieties in grain production at the College. Of all the varieties which have been grown in the experiments at Guelph during the last five years, the Siberian stands fourth in average yield per acre. The Yellow Kherson variety of oats was imported from the Agricultural College at Kansas. It is a Russian variety which was introduced through the United States Department of Agriculture. We obtained this variety five years ago and the sample which we obtained was badly mixed, some of the oats being white and some being yellow. After the first year's growth, we made a hand separation, and have continued to grow the yellow and the white strains separately in each of the past four years, and we find that they reproduce true to color. The Daubeney oats have been grown at the College for some twelve years with a good deal of satisfaction. This variety occupies highest place in average yield per acre of all the varieties which have been grown in the Experimental Department at Guelph for the past five years. This variety possesses a spreading head and a white grain which is exceptionally thin in the hull. In the average of four years' experiments at the College, the Daubeney oats had 24.7 per cent. of hull, the Yellow Kherson, 26.3 per cent. and the Siberian and Liberty each 29.5 per cent. of hull. The Daubeney oats are very early and are one of the best varieties for mixing with six-rowed barley when it is desired to grow oats and barley in combination.

According to the reports obtained from experimenters, the Siberian variety had slightly more rust than either the Daubeney or the Kherson, but it was somewhat stiffer in the straw than either of these two varieties. Either the Liberty or the Siberian are good oats for general cultivation. The Daubeney and the Kherson varieties are amongst the very best of the early oats, and are both well suited for growing in combination with barley.

Six-Rowed Barley. According to the Ontario Bureau of Industries, the average yield of oats in Ontario for the last twenty-eight years has been 35.6 bushels in comparison with 27.7 bushels for barley. If we reckon this out to pounds per acre, we will find that the barley has given an average of 120 pounds of grain per acre more than the oats. According to the reports here referred to, barley stands the highest in pounds of grain per acre of all the cereal crops of Ontario with the exception of corn.

From experiments conducted at Guelph during the past twenty years, it has been clearly demonstrated that of the existing varieties of barley, the six-rowed surpassed the two-rowed barleys in productiveness.

The Mandscheuri variety of six-rowed barley was imported by the College in the spring of 1889. It made a high record on the experimental plots at Guelph. When its value was ascertained, this variety was distributed over the Province through the medium of the Experimental Union. It is now grown on fully eighty per cent. of the barley lands of Ontario. The Introduction of this variety is undoubtedly responsible for a considerable amount of the increase in the yield of barley per acre over Ontario during the past few years. The O. A. C. Number 21 barley is now taking the lead, however, and will likely be grown very extensively in a short time. This barley was originated from a single plant selected from

among nearly 10,000 plants of the Mandscheuri barley grown in a nursery plot at the College in 1903. When carefully tested, it was distributed in small lots through the medium of the Experimental Union. According to the reports of the co-operative experimenters, the O. A. C. Number 21 barley surpassed the Mandscheuri variety in length of straw, in freedom from rust, and in yield per acre of both grain and straw. About 20,000 bushels of this barley were grown in Ontario in 1909 as the direct result of the small lots distributed throughout Ontario during the three years previous.

In 1910, arrangements were made for testing the comparative merits of the O. A. C. Number 21 barley, which is now the leading six-rowed bearded barley, with the Success, which is one of the leading beardless varieties, and also with the Common Emmer, which has been a fairly close rival in productiveness of the leading varieties of barley and of the leading varieties of oats throughout Ontario during the past three or four years. The results of the co-operative experiments conducted on twenty-eight farms during the past year show that the O. A. C. Number 21 barley headed the list in yield of straw and in yield of grain per acre. In fact, it surpassed the Emmer by 353 pounds and the Success barley by 522 pounds of grain per acre. While some experimenters referred to both the Emmer and the Success barley as having a small amount of rust, no experimenter reported any rust on the O. A. C. Number 21 variety. The O. A. C. Number 21 has been particularly free from the attacks of the rust, not only in 1910, but also in the co-operative experiments for the three years previous and in the experiments at the College. This barley was also a little stiffer in the straw than either the Emmer or the Spelt throughout Ontario in 1910. Some experimenters referred to the Success barley as being slightly affected with the smut, but no reports were received of smut occurring in either the Emmer or the O. A. C. Number 21 barley.

According to the results at the College and throughout Ontario, the O. A. C. No. 21 barley appears to be the best variety of six-rowed barley in cultivation in the Province at the present time.

Two-Rowed Barley. In Europe the two-rowed barleys are grown extensively, but in this country their cultivation is very limited. We find in our experimental work at the College that we obtain decidedly larger average yields per acre from the leading six-rowed than from the leading two-rowed varieties of barley. In 1910, as in 1909 and 1908, the two varieties of two-rowed barley which were used for the co-operative experiments throughout Ontario were the Hanna and the Two-rowed Canadian. In each of these three years, the former surpassed the latter in yield of grain per acre. In the results for the past year, there was an average yield of grain per acre of nearly five bushels more from the Hanna than from the Two-rowed Canadian. The Hanna is a Russian variety obtained by us through the Department of Agriculture of the United States.

Hulless Barley. Considerable interest was taken in the hulless barley in Ontario, especially at the time when the weevils were causing so much damage to the pea crop in the south western part of Ontario, and when the farmers were, to some extent, growing hulless barleys to take the place of the peas, especially in a few localities. We have tested in all some fifteen varieties of hulless barley at the College. These have been obtaind from a number of different countries. The Black Hulless is the oldest and probably the best known variety in Ontario. The Guy Mayle hulless barley has surpassed the Black variety in yield per acre and in strength of straw in the experiments at the College. It will be seen from the tabulated results here presented that the Guy Mayle surpassed the Black Hulless

in yield of grain per acre in the co-operative experiments in 1910. This was also the case in the experiments throughout Ontario in 1909, the difference being even more marked in that year than it was in 1910. In the co-operative experiments in Ontario during the past year, the Guy Mayle proved to be somewhat stiffer in the straw than the Black Hulless variety.

Spring Wheat. Three varieties of spring wheat were distributed in the spring of 1910. These represented two distinct classes or types. The Wild Goose represents the durum or the macaroni wheats and the Red Fife and Hungarian, the flour wheats. In experiments at the College, the Wild Goose variety usually produces a larger yield of grain per acre than any of the varieties of spring wheat which are grown especially for flour production. In the co-operative experiments throughout Ontario in 1910, the Wild Goose again heads the list in yield of grain per acre, surpassing the Red Fife by an average of nearly two bushels of grain, and in turn the Red Fife surpassed the Hungarian by nearly one bushel per acre on the average. The Hungarian is a bearded variety of red wheat which is very early in reaching maturity. It was obtained from the Argentine Republic a few years ago and has been giving good results for bread production in the tests made by the Chemical Department at the College. It is, however, a little weaker in the straw than Red Fife. In an inquiry made throughout Ontario in 1910, it was ascertained that the Red Fife is still the most extensively grown of the spring wheats for flour production in the Province. The White Fife is also grown to a considerable extent in some localities. The spring wheat is nearly all grown in the eastern part of Ontario, there being practically none produced in many of the counties in the western part of the province.

Buckwheat. As in each of the past two years, the Rye buckwheat has surpassed the Silver Hull in yield of grain per acre in Ontario. The yield in 1910 was considerably lower than that of 1908 and slightly lower than that of 1909. The Rye buckwheat is grown quite extensively in Nova Scotia, but it has not as yet been brought into general cultivation in our Province. In experiments at Guelph, it has surpassed all other varieties in yield of grain per acre during the past five years.

Emmer and Spelt. These represent two distinct types or species of wheat. They have been grown in some of the European countries for long periods of time. It is only in recent years, however, that attempts have been made to grow these grains in general cultivation in this country. One of the peculiarities of the varieties of each of these classes is the closeness with which the chaff adheres to the grain. When threshed there is not a clear separation of the grain and the chaff, but both come from the machine together and are afterwards ground into meal. The Emmer usually possesses about 22 per cent. of hull or chaff, and the Spelt about 30 per cent. It will therefore be seen that the amount of hull on the Emmer is considerably less than that on the average variety of oats, which usually runs about 30 per cent. Both Emmer and Spelt have been distributed throughout Ontario for co-operative experiments in each of the past seven years, the following being the yields per acre from the two varieties, respectively: 1904, 2,274 lbs., 1,263 lbs.; 1905, 1,589 lbs., 1,276 lbs.; 1906, 1,578 lbs., 1,106 lbs.; 1907, 1,768 lbs., 952 lbs.; 1908, 1,731 lbs., 1,002 lbs.; 1909, 1,815 lbs., 1,190 lbs.; and in 1910, 1,374 lbs., 1,314 lbs. It will therefore be seen that the Emmer has surpassed the Spelt in yield of grain per acre in every one of the past seven years. In both the experiments at the College and in the experiments throughout Ontario, the Emmer forms a close rival to the best varieties of oats and the best varieties of barley in yield per acre. In 1910, however, the Emmer was surpassed con-

siderably by the O. A. C. Number 21 barley, as will be seen by an examination of the test previously referred to.

Winter Wheat. Five varieties of winter wheat were distributed to the co-operative experimenters in the autumn of 1909. Only three varieties were sent to each individual, but as the American Wonder variety was sent to every experimenter, this formed a basis by which all the results could be brought into one table. The American Wonder, which heads the list in yield of grain per acre and in popularity, is a winter wheat resembling very closely the Dawson's Golden Chaff both in appearance and in quality. It is a stiff strawed variety, possessing a beardless head with red chaff and white grain. The Imperial Amber, which stands second in yield per acre in 1910, is not quite as stiff in the straw as the American Wonder variety, but is a somewhat better wheat for flour production. The Tasmania Red, which stands third, and the Crimean Red, which stands fifth on the list in yield per acre, are both very excellent wheats for bread production, according to the tests made in the Chemical Department at our College.

Winter Rye. Of the four varieties of winter rye which have been tested at Guelph in each of the past seven years, the Mammoth White has headed the list in yield of grain per acre in six of these years, and stood second in yield per acre in the other year. It will be seen from the results here presented that it also surpassed the Common rye in the co-operative experiments throughout Ontario in 1910. This variety of winter rye has certainly made the highest record of all the varieties which we have had under test.

Field Peas. The pea crop in Ontario is an exceedingly important one. The farmers of the United States envy those of Ontario in the successful growing of what they term the Canada Field Pea. Even in Ontario, however, this valuable crop has its drawbacks. The pea weevil (*Bruchus pisi*) became so troublesome a few years ago that many farmers discontinued growing peas for a few years. Owing to a couple of comparatively cool, wet summers combined with the fact that many farmers had stopped growing peas entirely, the pea weevil was almost eradicated, and during the past five years this crop is being grown considerably in Ontario. Although, on the average, the yield of peas per acre will not quite equal the yield of barley, oats, or winter wheat, yet when we take the quality into consideration we find that it is one of the greatest producers of digestible protein and of digestible carbo hydrates of all the crops grown in this Province. For three years, we distributed no field peas throughout Ontario except in those districts where the pea weevil had not yet been found. In each of the past five years, however, we have complied with practically all requests for peas for experimental purposes. In the spring of 1910, we distributed two varieties and have received thirty-five good reports of carefully conducted experiments. These reports show us that on the average the New Canadian Beauty gave a little higher average yield of grain per acre than the Early Britain variety. According to the reports of the experimenters, the Early Britain possesses rather better straw for feeding purposes than the Canadian Beauty, the straw of the last named variety being rather large and coarse. The Early Britain peas appear to be rather better for rich land than the Canadian Beauty variety. Although the weevils did comparatively small damage in 1910, from careful observations it was found that they were still active in a few localities, and that the Early Britain appear to be slightly more affected with this insect pest than the Canadian Beauty variety. Peas of the Canadian Beauty variety are large, smooth and white, while those of the Early Britain variety are of brown color. The last named variety, however, seemed to produce grain of excellent quality for the manufacture of split peas, as they have a rich yellowish appearance after the outside covering has been removed.

Field Beans. Although the bean crop is not a very important one in many of the counties of the Province, yet in Kent and a few other counties the beans form an important crop. No less than 471,880 bushels of beans were produced in Kent County in 1910. Upwards of thirty varieties have been grown at the College, and three leading kinds have been distributed throughout Ontario for co-operative experiments. The tabulated results show that the highest yield this year was produced by the White Wonder with an average of 21.1 bushels per acre. This variety also occupied highest place in the co-operative experiments over Ontario in 1909, and second place in yield per acre in each of the years 1908 and 1907. Both the White Wonder and the New Prize Winner varieties are earlier in reaching maturity and possess a shorter straw than the Marrowfat variety.

Soy Beans. About twenty varieties of soy, soja, or Japanese beans have been grown in an experimental way at the College. Most of these varieties require too long a season to give satisfactory results in this Province. From this list, however, two of the earliest varieties have been selected and have been sent out for experiments in the Province. The results are very meagre for 1910, and show the yields to be comparatively low. It should be remembered, however, that the soy beans are exceedingly rich in digestible nutrients, comparing favorably with cotton seed meal when ground and used for feeding purposes. The Early Yellow variety, which has been grown at the College in each of the past fifteen years, has given an average of 15 bushels, or 900 pounds of grain per acre. The yield of the Early Yellow variety at the College in 1910 was 17.2 bushels, which was very much higher than the average yield of the experiments conducted on two Ontario farms.

Corn for Grain. The area used for the production of corn for husking in Ontario in 1910 amounted to 320,519 acres or almost exactly the same as the area used for the production of corn for the silo. As the different varieties of corn vary so much in the time which they require to reach maturity, etc., many of them are quite unsatisfactory for grain production in this Province. Three varieties which have given very good results in the experiments at Guelph and which were comparatively early in reaching maturity were selected for distribution for the co-operative experiments in the spring of 1910. Although a considerable number of reports were received giving the total yield and other information, the number of those giving the full information in regard to the yield of shelled grain was twenty. In former years, three flint varieties were used for this experiment. In 1910, however, one dent variety was included with two flints. The results of the twenty experiments show that in yield of shelled grain the Wisconsin Little Dent gave the highest average yield per acre, being about five bushels more than the Genesee Valley yellow flint, and 8.5 bushels per acre more than the King Phillip red flint. Not only did the Wisconsin Little Dent give the greatest yield per acre, but it was the most popular variety with the experimenters. As time advances and varieties of corn are better known, it is probable that some of the earliest varieties of dent corn will be used much more extensively than they are at the present time. In the co-operative experiments over Ontario in 1909, the average yields per acre of the three varieties sent out in that year were in the following order: Genesee Valley, Compton's Early, and King Phillip. It will therefore be seen that the Wisconsin Little Dent, which surpassed even the Genesee Valley in the co-operative experiments in 1910, has made a very good showing. It will be noticed that the total crop is very light. A few of the experiments gave a small amount of total crop but a fair amount of grain, and these were included in the summary. The light yield is probably due, to a considerable extent, to the crop being pretty thoroughly ripened and the stalks comparatively dry.

Mixtures of Grain for Grain Production.

Within the past twenty years a large amount of experimental work has been carried on at the Agricultural College to determine the comparative values from growing grains in mixtures as against the growing of the same kinds of grain separately. A study has been made of the various classes of grain in order to ascertain which kinds can be mixed together with the best results for green fodder, for hay, and for grain production. For the details of these results, the reader is referred to the Annual Reports of the Ontario Agricultural College. The experiments at the College have shown that when varieties of the same class have been mixed together, practically no advantage has been obtained, but when different classes of grain have been properly combined by using the best varieties and the most suitable amount of seed of each, increased yields have resulted. Of the different classes of grains which have been used, a combination of barley and oats has been instrumental in producing the greatest yield of grain per acre. In testing different varieties both at the College and for five years in succession in connection with the Experimental Union throughout Ontario, it was found that the Daubeney oats and the Mandscheuri barley made a very admirable combination, ripening at the same time and giving a high yield of grain of excellent quality. The O. A. C. Number 21 barley should prove equally as valuable as the Mandscheuri variety for mixing with the Daubeney oats. Another experiment was conducted at the College for five years in succession in growing nine different proportions of oats and barley in order to find out which would be the most productive. The average results show that one bushel of barley and one bushel of oats by weight gave a higher yield of grain than any of the other mixtures, of which four were greater and four were less in amount. In another experiment, which has now been conducted for four years at the College and in which nine proportions were used, all being different from those of the first experiment with the exception of the one which has given the highest yield per acre, it has been found that the one bushel of oats and the one bushel of barley by weight again headed the list in productiveness.

In the spring of the present year, an experiment was arranged for the Experimental Union in which barley and oats mixed in three different proportions could be tested throughout the Province. For these three rates of seeding, the following amounts by weight were used per acre: (1) Oats, one-half bushel and barley one-half bushel. (2) Oats, one bushel and barley one bushel. (3) Oats, one and one-half bushels and barley one and one-half bushels. It will therefore be seen that the total amount of seed would amount to 1, 2, and 3 bushels per acre. The varieties used in this experiment were the Daubeney oats and the Mandscheuri barley. The following table gives the average results of the good reports of successfully conducted experiments with the mixtures of oats and barley for 1910:

Varieties and Combinations.	Seed per acre. lbs.		Comparative Value.	Yield per acre.	
	Varieties.	Mixtures.		Straw tons.	Grain lbs.
Daubeney Oats	17	41	40	1.3	1,528
Mandscheuri Barley	24				
Daubeney Oats	34	82	100	1.5	2,104
Mandscheuri Barley	48				
Daubeney Oats	51	123	100	1.6	2,096
Mandscheuri Barley	72				

It will be seen that the results over Ontario correspond closely with those at the College, viz., that one bushel of Daubeney oats and one bushel of Mandscheuri barley, by weight, has given a greater yield of grain per acre than either a heavier or a lighter seeding. The yield, however, is only slightly greater than that obtained from the heaviest seeding. It must be remembered, however, that less seed was required for the mixture which gave the highest results than the one which gave a yield slightly less. The area in Ontario which is being used for mixed grain is increasing from year to year, and we notice from the Report of the Bureau of Industries for 1910, that no less than 497,936 acres were used for mixed grains in the past year.

Field Roots, Fodder Crops, Grasses, Clovers and Alfalfa.

Besides co-operative experiments with varieties of grain crops, potatoes, sweet corn, and with different kinds of fertilizers, farmyard manure, etc., others were conducted with mangels, sugar beets for feeding purposes, swede turnips, fall turnips, carrots, fodder corn, sorghum, millet, grass peas, vetches, rape, kale, field cabbage, grasses, clover and alfalfa. The average results of the carefully conducted experiments with the most of these crops are here presented in tabulated form. It is difficult to secure full reports of the grasses, clovers, alfalfa, etc., in such a way that they can be presented in the form of a table. The following tabulated results should be read with much interest, as it is indeed difficult to secure information of this kind from any other source:

Field Roots and Fodder Crops.

Experiments.	Varieties.	Comparative Value.	Yield per Acre (Tons.)
Mangles (10 tests)	Ferry's Yellow Leviathan	100	23.20
	Ideal	87	22.11
	Sutton's Mammoth Long Red	78	22.05
Sugar Beets (3 tests)	Bruce's Giant White Feeding	100	27.03
	Rennie's Tankard Cream	67	22.72
Swede Turnips (2 tests)	Carter's Invicta	100	17.20
	Steele Brigg's Good Luck	96	16.66
	Rennie's Prize Purple Top	90	14.89
Fall Turnip (1 test)	Red Top White Globe	100	19.56
	White Egg	100	19.36
Carrots (7 tests)	Simmer's Imp. Giant Short White	100	22.34
	Steele Brigg's Imp. Short White	84	21.67
Fodder Corn (2 tests)	Henderson's Eureka	100	14.52
	White Cap Yellow Dent	100	10.52
	Sterling White Dent	100	10.46
Grass Peas and Vetches (3 tests)	Grass Peas	86	8.06
	Hairy Vetches	100	7.27
	Common Vetches	71	5.21
Hairy Vetches and Winter Rye (1 test)	Winter Rye	100	10.80
	Hairy Vetches	96	10.16
Millet (1 test)	Japanese Panicle	100	11.36
	Hungarian Grass	98	10.88
	Golden Wonder	96	10.80

Mangels. No less than 68,966 acres were used for the mangel crop in Ontario in 1910. The mangel crop during the last few years has been increasing to a small extent, while the area devoted to the turnips has been gradually decreasing. According to the Bureau of Industries for Ontario, we find that in the average of the last twenty-eight years the area devoted to turnips was fully three times as great as that used for the mangel crop. At the present time, however, the mangel area is practically two-thirds of that used for the growing of turnips. The indications are, that in a few years more, as great an area will be used for the growing of mangels as that used for the growing of turnips in this Province.

The varieties of mangels grown in Ontario might be grouped into four classes according to the shape of the roots, as follows: First, long; second, intermediate; third, globe; and fourth, tankard. There has been an impression abroad that the varieties of mangels belonging to the long red class are usually, if not always, the greatest yielders of roots per acre. In our experiments at Guelph during the past few years, we have found that some of the heaviest yielders of roots have belonged to the intermediate and the tankard classes. Our College Reports will show that the Yellow Leviathan, which belongs to the intermediate class, and the Griewener variety, which belongs to the tankard group, occupies the highest place in average yield per acre of all the varieties grown for a series of years.

For the co-operative experiments throughout Ontario for 1910, a leading variety of each of three classes of roots was distributed. The Yellow Leviathan, which comes at the top of the list, belongs to the intermediate class. The Ideal, which comes second on the list, is tankard in form, and the one indicated by the name Sutton's Mammoth Long Red, which gave the lowest average yield per acre in the co-operative experiments, belongs to the long red class. The Yellow Leviathan has now been used in the co-operative experiments for several years in succession. It occupied highest place in average yield per acre in 1904, 1905, 1906, 1907, 1909, and 1910, and second highest place in yield per acre in 1903 and in 1908. It will therefore be seen that in the co-operative experiments throughout Ontario during the past eight years, the Yellow Leviathan occupied highest place in six of those years.

The Yellow Leviathan variety of mangels was originally obtained from D. M. Ferry of Windsor, Ontario, but recently it is advertised by at least seven of the seedsmen of Ontario who issue seed catalogues. In 1909, the Yellow Leviathan seed was obtained from five and in 1910 from seven Ontario seedsmen. The seed was carefully examined in the experimental plots at Guelph. In 1910 this variety was advertised by both John A. Bruce, of Hamilton, and J. A. Simmers, of Toronto. The roots, however, produced by the seed obtained from these two sources proved to be quite different in type from the Yellow Leviathan which has been carefully tested at the College and throughout Ontario for the last few years. Not only were these two lots different in type, but they gave fully three tons per acre less in yield than the lowest of the other five lots. Of the different lots of Yellow Leviathan obtained from Ontario seedsmen in 1909 and again in 1910, the seed received from the Wm. Rennie Co., Toronto was the lowest in germination in both years as determined in the field tests at the College. In order to ascertain the vitality of the different lots, four distinct tests were made in 1909 and two in 1910. Of the different lots of seed of the Yellow Leviathan variety obtained from Ontario seedsmen in 1910, that received from D. M. Ferry gave the highest yield of roots per acre.

Sugar Beets for Feeding Purposes. There are two classes of sugar beets grown in Ontario which are quite distinct. One class produces roots which grow

almost entirely under the ground, are rather small in size, and contain a high percentage of sugar. These are grown largely to be sold to the factories for sugar production. The sugar beets of the other class grow considerably out of the ground, produce larger roots which are easier harvested than those of the other class, but which do not produce as high a percentage of sugar and are grown as a feed for farm stock. A number of varieties of each of these classes have been carefully tested at the Agricultural College for several years in succession. For the co-operative work over Ontario, two varieties of sugar beets for feeding purposes were tested in 1910. The Bruce's Giant White Feeding occupied highest place with 27 tons per acre, and the Rennie's Tankard Cream second place with nearly 23 tons per acre. It should be mentioned in this connection that, according to the analysis made at the College for several years in succession, the Bruce's Giant White Feeding gave 8.1 and the Rennie's Tankard Cream 8.6 per cent. sugar. In the average of six years' experiments at the College, the Bruce's Giant White Feeding has given 26.8 and the Tankard Cream 23.6 tons per acre per annum.

Swede Turnips. The yields per acre of Swede turnips were comparatively light in the co-operative experiments over Ontario in 1910. In 1909, the Carter's Invicta have an average of 25.2 and 1910 an average of only 17.2 tons per acre. The past year was not a very favorable one for high yields of turnips per acre in Ontario. The Carter's Invicta variety, which stands first in yield per acre for the past year, also came highest in the co-operative experiments in 1909 and in 1907, and stood second in yield per acre in 1906.

Fall Turnips. The fall turnips are not grown very extensively in Ontario. The yield of this class is usually greater than that of the swede turnips. In 1910, however, the Red Top White Globe, the highest yielding variety of this class, gave only 19.56 tons of roots per acre.

Field Carrots. The area devoted to field carrots in Ontario is only about one-third as large now as it was twelve or fifteen years ago. There is a great similarity in the varieties of carrots, and especially in those of the short white class which are sold under different names by the seedsmen. Any one of these intermediate varieties is superior to the old White Belgian carrot which was extensively grown in former years.

Fodder Corn. No one variety of fodder corn is suitable for all parts of Ontario, and the summary results of this experiment are of very limited value. The White Cap Yellow Dent variety is now one of the most popular and extensively grown varieties of fodder corn in south-western Ontario. It produces a fairly good yield of total crop per acre, is of good quality, and is much earlier than the Henderson's Eureka or a number of other varieties of large dent corns. The Henderson's Eureka is one of the best of the very large varieties of dent corn, but it is only suitable for the light, warm soils in the extreme southern part of the Province. The Sterling White Dent is quite early and might be suitable in some localities where the White Cap Yellow Dent is a little too late.

Sorghum. There are a number of classes of crops under this heading, such as sugar cane, broom corn, Kaffir corn, millo maize, Jerusalem corn, etc. About thirty varieties of sorghum have been under experiment at the College. Two kinds of sugar cane were distributed in the spring of 1910 for co-operative experiments, viz., the Early Amber and the Early Minnesota varieties. Owing particularly to the cold, wet weather in the month of May this crop did unusually poor this season, and although a number of reports were received, we were unable to make a summary of the exact yields per acre of the two varieties. Even in 1910, however, the writer saw a field of about seven acres of Early Amber sugar cane on gravelly

soil in Middlesex County which produced an average of about twenty-two tons of crop per acre.

Grass Peas and Vetches. These are three leguminous crops which produce fodder rich in digestible nutrients, and which have a beneficial influence on the soil. The Grass Peas have been grown in Ontario for many years past as a grain crop, and also to a certain extent as a fodder crop. The Common Vetches have been used in some localities for mixing with oats for the production of either green fodder or of hay, and the Hairy Vetches are a more recent introduction and have been used considerably with a good deal of satisfaction as a cover crop by some of our best fruit growers. These three, along with a number of other leguminous crops, have been brought into competition at the College for fodder production. The results of the co-operative experiments during the past few years vary considerably. The Hairy Vetches occupied highest place in average yield of green crop per acre in 1906, 1907, 1908 and 1909, and second place in yield per acre in 1904 and 1910, and third place in yield per acre in 1905. The Common Vetches usually give poor results when grown by themselves in Ontario.

Hairy Vetches and Winter Rye for Fodder Production. In the autumn of 1909 both Hairy Vetches and Winter Rye were sent out over Ontario to be sown in the autumn for the production of fodder in the following spring. The Winter Rye surpassed slightly the Hairy Vetches in yield of green crop per acre as the result of this test.

Millet. Three varieties of millet were again distributed in the spring of 1910. The Japanese Panicle variety gave the largest yield of green crop per acre. This variety heads the list in fodder production of about thirty varieties which have been grown at the College for the last few years.

Rape, Kale and Field Cabbage. For seven years in succession twenty-five varieties of rape, kale, field cabbage, Brussels sprouts, etc., have been grown in the Experimental Department at the College. In these results the Sutton's Earliest Drumhead cabbage has given the highest average yield of green crop per acre when the seed was sown and treated in exactly the same way as that of rape. In each of the past three years the Sutton's Earliest Drumhead cabbage has been incorporated in the work of the Experimental Union. The demand for the seed for the cabbage, kale, and rape has been very limited each year. The results of the two good reports of the successfully conducted experiments in 1908 and of the four in 1909 show that the field cabbage gave a yield considerably higher than either the Dwarf Essex rape or the Thousand Headed kale. In 1910, however, although a few reports were received, the yields of all of the varieties were not given with sufficient completeness to enable the results to be presented in tabulated form.

Grasses. The varieties of grasses which have been distributed during the last few years are the Tall Oat, Orchard Grass, Tall Fescue, Western Rye, Lyme Grass, and Timothy. The Tall Oat has usually produced a very early crop and a large yield of hay, but it is difficult to secure satisfactory returns for presenting in a concise tabulated statement. We are, however, accumulating information from year to year which is valuable, and which, when brought together, should prove of considerable service.

Clovers. The Common Red, the Alsike, and the Mammoth Red varieties of clover have been distributed each year for some time past. As the Common Red usually produces two crops in the one year, and each of the others one crop per season, and as the Common Red is not apt to survive the second winter as well as the Mammoth Red it is difficult to get accurate results which will form a good

summary report. The experimenters, however, secure information regarding these clovers, and data is gradually being obtained from the reports received from year to year.

Alfalfa or Lucerne. In thirteen years' experiments at the College in growing Alfalfa the average yield of green crop per acre has been a little over 21 tons, and the yield of hay per acre slightly over 5 tons. There has been an average of three cuttings per annum, or of thirty-nine cuttings during the thirteen years. During the last two years we have distributed throughout Ontario Turkestan Alfalfa seed, Grimm Alfalfa seed, Panhandle Alfalfa seed, Alfalfa seed produced in Ontario, and Alfalfa seed produced in the Western States. We hope, in a short time, to have valuable information from these experiments. The time, however, is yet too short to give much definite information of value.

From a somewhat extensive correspondence during the past year we have accumulated a considerable amount of valuable information in regard to the production of Alfalfa seed in this Province. We find that the first crop in the year is nearly always converted into hay, and in a good many instances the second crop is allowed to ripen its seed. The average yield of seed per acre is a little over two bushels, and the price realized is about $9 per bushel, or a total of practically $18 per acre for the seed obtained from the second crop of Alfalfa each season. Seed production does not seem to injure the Alfalfa plants to any marked degree. We hope, during the next year, to make a further study of Alfalfa seed production in this Province. For fuller information regarding experiments in Alfalfa growing in Ontario, the reader is referred to the Ontario Agricultural College Bulletin 165, copies of which can be obtained from the Department of Agriculture, Toronto, Ontario, and to an address given by the writer at the Provincial Winter Fair, Guelph, in December, 1910, which is being printed in the Annual Report of the Winter Fair for that year, and copies of which can also be obtained from the Department of Agriculture at Toronto as soon as printed.

Sweet Corn for Home Use.

About fifty varieties of sweet corn have been under test at the Ontario Agricultural College. It has been found that there is a very marked difference in the different varieties in table quality for home use. In order to give the farmers an opportunity to test for themselves a few of the very best varieties of sweet corn and to thus enable them to more thoroughly appreciate the value of the best kinds of sweet corn, three choice varieties have been distributed during the past few years. The following table gives the average results of eighteen carefully conducted experiments with three varieties of sweet corn in 1910:

Experiment.	Varieties.	Comparative Value.	Number of Ears.	Number of days until ready for table use.	Table Quality.	
					Flavor.	Juiciness.
Sweet Corn [18 tests]	Golden Bantam	100	164	90	100	100
	Mammoth White Cory	68	163	91	73	77
	Malakhoff	55	162	89	65	64

The Golden Bantam has proven to be the favorite variety of sweet corn for home use of all the varieties which have been tested at the College. It also occupied the highest place in the co-operative experiments throughout Ontario in each of the past four years. The ears are rather small, yellow in color and possess eight rows. The corn is exceedingly tender and is of excellent flavor. The Mammoth White Cory which stands second in comparative value in 1910 is, according to the reports of the experimenters, the most extensively grown variety of sweet corn for home use in Ontario at the present time. The Malakhoff variety, which stands at the bottom of the list in the co-operative experiments for 1910, is a Russian variety which was imported by the Department of Agriculture at Washington, and regarding which much has been claimed in recent years. For those who wish a very excellent variety of sweet corn for home use we are compelled to refer to the Golden Bantam as the one which has made the best record at the College and throughout Ontario.

Varieties of Potatoes.

There were 168,454 acres of potatoes in Ontario in 1910. The average yield of potatoes per acre according to the Bureau of Industries for Ontario was 130 bushels in 1910, 145 bushels in 1909, and 116 bushels in the average of the last twenty-nine years.

An inquiry was made in 1910 of the various experimenters regarding the most extensively grown varieties of potatoes in the various counties of Ontario. In all, fifty-one varieties were mentioned one or more times as being the most extensively grown in the differnt localities. The following gives the names and the order of the varieties which were mentioned the greatest number of times: 1, Rural New Yorker No. 2; 2, Empire State; 3, Beauty of Hebron; 4, White Elephant; 5, Early Rose; 6, Irish Cobbler; 7, Delaware; 8, American Wonder; 9, Carman No. 1; 10, Green Mountain; 11, Early Ohio; 12, Gem of Aroostock. Some mentioned Carman No. 1, other Carman No. 3, and others simply Carman, so that it was very difficult to make a determination as to the extent to which each of these Carmans was grown in comparison with other varieties. From inquiries made in each of the past four years the Rural New Yorker No. 2 was mentioned first and the Empire State second each year, as being the varieties which are the most extensively grown throughout the Province. We wish to urge again the importance of the farmers selecting a few of the very best varieties of potatoes and confine their attention to these almost exclusively as their general crop potatoes so that good results in regard to yield, quality and prices could be obtained.

In the spring of 1910 the Experimental Union distributed two varieties of late, two varieties of medium ripening and four varieties of early potatoes for experimental purposes. Only two varieties were sent to each experimenter, but in each group of potatoes one variety was distributed throughout and used as a basis of comparison in summarizing the results. A very large number of applications were received in the spring of the year, and many valuable reports of successfully conducted experiments were obtained. The following table gives the average results of the co-operative experiments with the varieties of potatoes conducted on about 300 Ontario farms in 1910.

Classes.	Varieties.	Comparative Value.	Per Cent. of Small Tubers.	Mealiness when cooked.	Bushels of Whole Crop per Acre.
Late Varieties [50 tests]....	Empire State	100	11	100	172.7
	Dempsey's Seedling	88	11	88	168.0
Medium Varieties [71 tests]	Burpee's Extra Early	100	9	100	182.5
	Rose of the North	90	12	85	176.1
Early Varieties [167 tests].	Extra Early Eureka.....	100	8	97	174.0
	Early Dawn	89	11	100	166.9
	Early Fortune	86	11	97	166.4
	Early Andes	75	10	90	139.1

The average results of the co-operative experiments throughout Ontario show that the Empire State surpassed the Dempsey's Seedling by nearly five bushels per acre. The Empire State was pronounced by the experimenters to be excellent in mealiness and was more popular than the Dempsey's Seedling when everything was taken into consideration. The Empire State is a large white, smooth, oval shaped potato, which yields well and is of good table quality and sells well in our markets. Of the medium ripening varieties of potatoes the Burpee's Extra Early has headed the list in the co-operative experiments throughout Ontario, in each of the past four years. Not only has it given the greatest yield per acre, but it has also been the most popular with the experimenters in each of these years. The Extra Early Eureka has been distributed in connection with the co-operative experiments in each of the past four years. It stood second in the list in yield per acre of the early varieties in 1908, and the highest in the list in this respect in 1907, 1909 and again in 1910. It will be seen that in the results of experiments for last year it surpassed the Early Dawn by fully seven bushels per acre. The Early Eureka potatoes are large, white, very smooth, and comparatively round. The Early Fortune variety has occupied third place in yield per acre in the co-operative experiments with four varieties for four years in succession. The Early Ohio variety was used in the co-operative experiments in 1909, but as it came at the bottom of the list in yield, in mealiness, and in comparative value, it was dropped from the co-operative experiments in 1910.

Taking the results of the co-operative experiments, both for this year and for other years into consideration, we wish to draw attention, particularly to the most excellent results which have been obtained from the Empire State of the late, the Burpee's Extra Early of the medium, and the Extra Early Eureka of the Early varieties. A reference to the report for 1909 will show a similar statement made in that year. Our experience, therefore, during 1910 bears out very closely the experience of the previous years in regard to these three varieties of potatoes.

Fertilizers with Farm Crops.

Fertilizer experiments are amongst the most difficult to conduct, either at an Agricultural College or throughout the country. There is such a variation in the composition of different soils, of the solubility of the fertilizing constituents in the land, of the character of the sub-soil in relation to the under-drainage, of the kind of crops which are grown on the land, etc., that it is an exceedingly

difficult matter to secure results from any one farm which will exactly meet the conditions of another farm. Much has been done in laboratory work in analysing plants, soils, and fertilizers in a search for knowledge regarding the contents of the soil, the requirements of the plants, and the suitability of the fertilizers to meet these needs. When the fertilizers are applied to the soil, however, they do not always work according to the conclusions of the chemist drawn from his work in the laboratory. The fertilizers themselves, vary to a marked degree in both the amount and availability of plant food which they contain. In spite of these facts, however, it is useless to say that nothing of value can be accomplished. While it is true that all the information desirable cannot be obtained, it is nevertheless, true that information of real service can be obtained from field work with fertilizers.

Some comparatively simple experiments with fertilizers were arranged in connection with the Experimental Union eighteen years ago. While it is true that these experiments have not accomplished all that we would like to have fertilizer experiments accomplish, the same can be said of every fertilizer experiment with field crops which has ever been conducted in any country. The work which has been accomplished in the past has not only given some direct information, which is of value as a general guide, but it has also furnished a basis for better work in the future. Another important feature of the work, is the fact that men have been trained for undertaking more complicated and valuable work in securing information of even greater value. In the earlier years of the Union's work only six plots were used in each fertilizer experiment. During the last four years the fertilizer work with potatoes has included eight separate plots and in 1910 an experiment was started with fertilizers and barley, in which ten plots have been used. We, therefore, believe that we have, and will continue to obtain valuable information, not only for the farmers themselves who conduct the experiments, but also as a general guide in showing what the various fertilizers will accomplish with the different crops and on the various soils of the Province.

Both the fertilizers and the seeds have been sent from the College to experimenters each year. In every instance the Nitrate of Soda and the Muriate of Potash have been applied at the rate of 160 pounds per acre, and the Superphosphate at the rate of 320 pounds per acre. The mixture, or complete fertilizer has been composed of one-third the amount of these fertilizers, making in all 213 1-3 pounds. Both the Royal Canadian and the potato fertilizer used in 1910 with the potato crop, were applied at the rate of 320 pounds each per acre. In all cases, the nitrate of soda has been applied when the plants were about three inches in height, and all the other fertilizers at the time of sowing the seed. Farmyard manure has been used in the experiments of the past eight years. The advice to each experimenter has been to apply 500 pounds of average cow manure per plot, the application being equal to twenty tons per acre. The cow manure has been mixed with the soil to a depth of from four to five inches, and the fertilizers have been stirred in the soil to a depth of from one to two inches.

The foregoing description applies to all the co-operative experiments conducted previous to 1910, also those conducted in the past year with winter wheat, turnips and potatoes. Another experiment with fertilizers and barley was started in the spring of the past year, which will be described more fully in another part of this report.

The table here presented gives the average results of the co-operative experi-

ments with fertilizers on different kinds of farm crops for a period varying from four to eight years.

Kind of Fertilizer used.	Average yield per acre.								
	Fertilizer per acre.		Oats.	Winter Wheat.	Fodder Corn.		Mangels.	Swede Turnips.	Potatoes.
					Total.	Ears.			
	Weight.	Cost.	5 years, 74 tests.	6 years. 17 tests.	8 yrs. 47 tests.	8 yrs. 41 tests.	5 years. 41 tests.	5 years. 18 tests.	4 years. 85 tests.
	Lbs.	$ c.	Bus.	Bus.	Tons.	Tons.	Tons.	Tons.	Bus.
Nothing	.....	.....	38.9	20.0	8.2	2.7	20.6	19.6	141.1
Nitrate of Soda	160	4 80	46.3	24.1	9.4	3.1	26.5	22.5	166.7
Muriate of Potash...	160	4 00	45.8	23.1	9.4	3.0	24.6	23.7	173.2
Superphosphate	320	3 92	43.6	22.6	9.0	3.1	24.2	24.7	169.0
Complete Fertilizer.	213	4 24	48.7	24.9	9.4	3.2	25.4	25.0	180.1
Potato Fertilizer....	320	5 52	.....	.....	.....	.....	.....	.....	180.5
Royal Canadian,....	320	5 60	.....	.....	.....	.....	.....	.....	177.1
Cow Manure.....	40,000	6 00	.....	27.0	.....	.....	.....	26.9	187.8

The average results of the co-operative experiments with fertilizer on winter wheat, swede turnips, and potatoes for 1910 are included in the summary here presented.

The cost of each fertilizer, as given in the table, represents very closely the average cost per acre for the fertilizers as used in the co-operative experiments. The quotations were based on the factory price for quantities of about one ton of each fertilizer. The twenty tons of cow manure would mean about twelve good sized loads per acre, and manure in Guelph has been selling at fifty cents per load, which is probably about the average for the Province. It is exceedingly difficult to place a price on farmyard manure, as in most cases it is not purchased but is produced on the farm. Each person may place such value on the manure as he deems expedient, and study the results according to his own circumstances. It should be stated that the freight on the fertilizers and the application of both the fertilizers and the manure are not taken into consideration in the foregoing statement, nor yet is there any account made of the influence of the different fertilizers and the manure upon the land after the first season.

Fertilizers with Oats. Seventy-four good reports of successfully conducted experiments in applying fertilizers to oats were received during the five years in which this experiment was conducted over Ontario. The lowest average yield was obtained from the unfertilized land, 38.9 bushels per acre; and the highest average yields from the mixed fertilizer, 48.7 bushels; and the nitrate of soda 46.3 bushels per acre. The unfertilized land produced the lowest yield per acre in each of the five years. The mixed or complete fertilizer gave the largest yield of oats per acre in the average results of this experiment in each of the five years in which it was conducted. Although the land which received the mixed fertilizer gave an average of 9.8 bushels of oats per acre more than the unfertilized land, still this increase was produced at a cost of about 42 cents per bushel, according to the present prices of fertilizers. It will, therefore, be seen that it is only in special years that these commercial fertilizers will give economical results with oats on the average land of Ontario. The mixed fertilizer gave a larger average yield

than no fertilizer on heavy soils by 12.7 bushels per acre, on light soil by 10.2 bushels per acre, and on black mucky soils by 7.1 bushels per acre.

Fertilizers with Winter Wheat. In the co-operative experiments with different fertilizers applied to winter wheat, it will be seen that the greatest average yield per acre was produced from the application of cow manure. The complete fertilizer, when applied at the rate of only 213 pounds per acre, gave about two bushels per acre below the cow manure. It will be observed that the land which received the complete fertilizer gave 4.9 bushels per acre more than that which received no fertilizer. According to the prices of the fertilizers given in the table, the most economical increase in yield of winter wheat was made by the application of the mixed fertilizer, and even in this case the cost of the increased yield amounted to 86 cents per bushel.

Fertilizers with Corn. In the average of experiments in applying fertilizers with corn in each of eight years, during which time forty-seven complete and satisfactory reports were received, it will be seen that the yields of whole crop produced by the plots which received an application of nitrate of soda, muriate of potash, and mixed fertilizer, were equal, while a plot on which superphosphate was applied produced nearly half a ton less than the others, and that the largest yield of husked ears was obtained when the mixed fertilizer was applied to the land. The muriate of potash produced the corn at the least cost per ton, but even with this fertilizer it cost $3.33 on the average to produce each additional ton of fodder corn.

Fertilizers with Mangels. During the five years in which fertilizers were used with mangels, forty-one good reports of successfully conducted experiments were received. These show that the smallest average yield was produced from the unfertilized plot, viz., 20.6 tons per acre, and that the largest average yield was produced from the nitrate of soda, viz., 26.5 tons per acre. As in the case with corn, the unfertilized land gave the lowest yield in each year. The nitrate of soda produced the highest yield in four out of five years. The average of 197 bushels of mangels per acre, produced by the nitrate of soda over the unfertilized land, was obtained at a cost of about 2.4 cents per bushel. The nitrate of soda produced the largest yield on both heavy and light soils, but on the black loams the muriate of potash gave the highest yield of mangels. The nitrate of soda showed the greatest influence upon the light soils, as in the average of fifteen experiments the sandy land which was fertilized at the rate of 160 pounds of nitrate of soda per acre gave an average yield of 7 2-3 tons per acre more than the land which was unfertilized.

Fertilizers with Swede Turnips. From the average results of the five years' experiments with fertilizers and Swede turnips, it will be seen that farmyard manure has given the largest, the complete fertilizer the second largest, and the superphosphate the third largest yield of roots per acre. According to the prices given for the manure and the fertilizers in the foregoing table, the increased yield of turnips was produced at a cost of 82 cents per ton by the use of cow manure, and 78.5 cents per ton, or 2.4 cents per bushel, by the use of the complete fertilizer.

Fertilizers with Potatoes. In the experimental grounds at the Ontario Agricultural College, thirteen different kinds of fertilizers were used with potatoes for five years in succession. The average results with that experiment showed that the Royal Canadian fertilizer gave the highest, and the Potato fertilizer the second highest yield of tubers per acre. Based on this experiment, another was arranged and was also conducted for five years in succession, and the results show

that the highest average yield of potatoes was obtained from the use of a mixed fertilizer, similar to the one used in connection with our co-operative work with other crops. This, however, was closely followed in yield by the Royal Canadian and by the Potato fertilizer. The last two are both complete fertilizers, each containing nitrogen, phosphoric acid, and potash. The Royal Canadian fertilizer is sold by the Capelton Chemical Co., Buckingham, Que., and the Potato fertilizer by the W. A. Freeman Co., Hamilton, Ont. In the spring of each of the past four years, both potatoes and fertilizers were distributed from the College to applicants throughout Ontario. From these experiments, reports of successfully conducted tests were received from twenty-two experimenters in 1907, sixteen in 1908, twenty-six in 1909, and twenty-one in 1910. The average results of the four years' tests are here presented in tabulated form. It might here be stated that the comparative results of the different fertilizers were quite similar in the four years. It will be seen from the summary table that of the commercial fertilizers, the three complete manures gave the highest results, and of these, the mixture composed of 53 pounds of nitrate of soda, 53 pounds of muriate of potash, and 107 pounds of superphosphate gave a higher yield per acre than either the Potato fertilizer or the Royal Canadian, each of which was applied at the rate of 320 pounds per acre. The highest yield of all in each of the past four years was produced by an application of cow manure at the rate of twenty tons per acre. The land thus treated gave an average of 46.7 bushels per acre more than the land which was unfertilized.

According to the prices given for the manure and the fertilizers in the foregoing table, the increased yield of potatoes was produced at a cost per bushel for complete fertilizer, 10.9 cts.: muriate of potash, 12.5 cts.; cow manure, 12.9 cts.; Potato fertilizer, 14 cts.; superphosphate, 14.1 cts.; Royal Canadian fertilizer, 15.6 cts.; and nitrate of soda, 18.8 cts.

The experimenters were asked to test the table quality of the potatoes, including both flavor and mealiness. Although about 80 per cent. of the experimenters evidently tested the potatoes as required, they were unable to observe sufficient difference in the quality to enable them to make a comparative report. Although the potatoes were not seriously affected with the scab in 1910, we find from the reports that those which had received the cow manure were injured slightly more than the others. In a few instances a small amount of rot was reported. The largest amount was found in the potatoes which had received the cow manure, and the next largest amount in those which had received either the nitrate of soda or were left unfertilized.

Fertilizers with Barley. In 1910 arrangements were made for conducting an experiment with fertilizers and barley throughout Ontario. The experiment was made to consist of ten plots, seven of which received commercial fertilizers, one lime, one cow manure, and one was left unfertilized. For the seven plots which received commercial fertilizers, nitrate of soda, superphosphate and muriate of potash were used singly and in combinations of two and all three together. The number of pounds per acre of each fertilizer used was 100 for both the nitrate of soda and the muriate of potash, and 200 for the superphosphate, whether these were sown separately or in combination. The freshly slaked lime was used at the rate of 1,400 pounds per acre, and the cow manure at the rate of 20 tons per acre. As in the case of the other fertilizer experiments, the nitrate of soda, in every instance, was applied when the plants were about three inches in height, and all the others were applied at the time of seeding. All other explanations for the

fertilizer experiments with barley are the same as those for the fertilizer experiments previously reported. The average results of the five reports of successfully conducted experiments are as follows:—

FERTILIZERS WITH BARLEY IN 1910.

Fertilizer.	Individual Fertilizer per Acre.	Total Fertilizer per Acre.		Yield per Acre.	
	Pounds.	Pounds.	Cost. $	Straw (tons.)	Grain (Bus.)
1. Nothing				1.00	26.17
2. Nitrate of Soda	100	100	3.00	.98	29.08
3. Muriate of Potash	100	100	2.50	1.17	30.25
4. Superphosphate	200	200	2.45	1.16	29.67
5. Nitrate of Soda	100	200	5.50	1.14	33.33
Muriate of Potash	100				
6. Nitrate of Soda	100	300	5.45	1.20	32.75
Superphosphate	200				
7. Muriate of Potash	100	300	4.95	1.18	33.00
Superphosphate	200				
8. Nitrate of Soda	100	400	7.95	1.28	35.92
Muriate of Potash	100				
Superphosphate	200				
9. Lime	1,400	1,400	4.60	1.25	30.67
10. Cow Manure	40,000	40,000	6.00	1.32	36.33

It will be seen from an examination of the table here presented that the fertilizers and the manure gave increased results over the unfertilized land, varying from 2.9 bushels of barley per acre through the influence of the nitrate of soda to 10.2 bushels of barley per acre as the result of the application of the farmyard manure. According to the increases in the yield of barley per acre and the prices of the fertilizers given in the table, it is found that on the average for each increased bushel of barley produced by the means of the fertilizers or the manure was brought about at a cost varying from 59 cents in the case of the farmyard manure to $1.03 in the case of the nitrate of soda.

In one experiment with fertilizers and barley which was conducted on a clay loam with a clay subsoil, and which was an alsike clover sod, the influence from the fertilizers was very slight, while in the case of another experiment on a clay loam, which had not received manure for many years, the fertilizers showed a very marked influence, as, for instance, the complete fertilizer gave fully double and the cow manure nearly three times the yield per acre as compared with the crop produced on the unfertilized land. This experiment will likely be repeated for several years in succession.

DISCUSSION.

A MEMBER: How do the Tartar King oats do?

MR. SQUIRRELL: The Tartar King variety has not yielded as well as the Siberian in our own tests here at the College or in the Experimental Union tests throughout Ontario. The Tartar King is also thicker in the hull than the Siberian and rather weaker in the straw.

A MEMBER: How is the Banner?

MR. SQUIRRELL: The Siberian stands higher than the American Banner in the experiments conducted at the College in the average of the past five years. These two varieties have always been close rivals.

A MEMBER: Are all the varieties on that chart early varieties?

MR. SQUIRRELL: No. The Liberty and Siberian are both fairly late in maturing. The Daubeney is one of the earliest maturing varieties.

A MEMBER: Why is the American Banner not on that list?

MR. SQUIRRELL: The American Banner is more grown now than any other variety of oats in Ontario. This variety and the Siberian are probably more largely grown than any other varieties.

A MEMBER: On what kind of soil will the Siberian do better than the Banner?

MR. SQUIRRELL: Both these varieties will give excellent results on an average clay loam soil, but the Banner seems to be more satisfactory on a heavy clay soil.

A MEMBER: Is the Banner a weaker oat in the straw than the Liberty or Siberian?

MR. SQUIRRELL: There is not much difference in the strength of straw of the Banner and Siberian varieties. The Liberty in experiments here at the College has proven to be stronger in the straw than any other variety which we had under test.

A MEMBER: How do they compare in percentage of hull?

MR. SQUIRRELL: In percentage of hull there is not much difference.

A MEMBER: On what soil will the Daubeney do best?

MR. SQUIRRELL: The Daubeney seems to give the best results on an average clay loam soil.

A MEMBER: What results have you had from the Newmarket?

MR. SQUIRRELL: We have not tested this variety through the medium of the Experimental Union, but in experiments here at the College it has not given as good yields per acre as the Siberian, but is slightly thinner in the hull than this variety.

A MEMBER: How is the Twentieth Century?

MR. SQUIRRELL: A fair yielder and quite early in maturing.

A MEMBER: Do you think that the Liberty would do better grown in the northern country, where the season is short?

MR. SQUIRRELL: No, the Daubeney would, I think, do better in such a climate.

A MEMBER: Why is the Daubeney not popular?

MR. SQUIRRELL: The principal reason seems to be due to the fact that it produces a smaller grain than the other varieties. It is thinner in the hull than any of the other varieties here tested, the average percentage of hull for the past four years being 24½.

A MEMBER: Do you judge varieties by the yield per acre?

MR. SQUIRRELL: Yes, by that and other points.

A MEMBER: Does the American Wonder surpass the Winter King wheat?

MR. SQUIRRELL: Yes, there is considerable difference in the yield of these two varieties in favor of the American Wonder.

A MEMBER: How does the Abundance variety of winter wheat stand?

MR. SQUIRRELL: It is one of our best yielders, although not quite as good a yielder as the American Wonder.

A MEMBER: How is the Red Clawson wheat?

MR. SQUIRRELL: Still a good yielder, but the quality of this variety is poor.

A MEMBER: How do the Imperial Amber and American Wonder compare in quality?

MR. SQUIRRELL: The Imperial Amber is the better of the two.

A MEMBER: How does the Dawson's Golden Chaff compare with the American Wonder in strength of straw?

MR. SQUIRRELL: There is very little difference in the strength of straw of these two varieties. Both these varieties are stronger in the straw than the other varieties here tested.

A MEMBER: Is not that a poor yield per acre?

MR. SQUIRRELL: No, it is about ten bushels more than the average of the Province for the past twenty-nine years.

A MEMBER: Is there any difference in the Canadian Beauty and the New Canadian Beauty varieties of peas?

MR. SQUIRRELL: No, these two varieties are the same.

A MEMBER: How does the Prince Albert variety of peas compare with these two?

MR. SQUIRRELL: The Prince Albert is a smaller grained variety than either of these and a poorer yielder.

A MEMBER: How do the Canadian Beauty and Early Britain varieties compare in time of maturity?

MR. SQUIRRELL: The Early Britain is about two days earlier.

A MEMBER: How many bushels of wheat do you sow per acre?

MR. SQUIRRELL: On an average clay loam, one and one-half bushels.

A MEMBER: Is there any other combination of grains that will produce more than the mixtures you have there?

MR. SQUIRRELL: No, there is no combination which we have tested that will produce more pounds of grain per acre than one bushel, by weight, of Daubeney oats and one bushel, by weight, of Mandscheuri barley, per acre.

A MEMBER: Have you had any experience with O. A. C. No. 21 barley mixed with oats?

MR. SQUIRRELL: No, but this variety of barley, which is an improved strain of the Mandscheuri, mixed with Daubeney oats, should give excellent results.

A MEMBER: Do you have any experience in testing Wild Goose wheat and oats?

MR. SQUIRRELL: Yes, this mixture has not yielded as well as oats and barley by about 200 pounds.

A MEMBER: Is the Wisconsin Little Dent the largest yielding variety of corn you have?

MR. SQUIRRELL: No, there are a number of varieties that will yield better than this one, but they are too late in maturing for general cultivation.

A MEMBER: How does the Longfellow compare with the King Phillip?

MR. SQUIRRELL: The King Phillip is about two days earlier in maturing and has yielded in the average of the past five years about six bushels of grain per acre more.

A MEMBER: How does the Wisconsin Little Dent do for ensilage?

MR. SQUIRRELL: For Central and Southern Ontario it is not as suitable a variety for ensilage purposes as the White Cap Yellow Dent. It produces a large yield of grain, but not a large total yield of crop.

PROF. C. A. ZAVITZ: In the first place, we see the large yield of grain from corn as compared with all the other crops. In the second place, the large yield from the mixed grain, especially from the combination of one bushel of each to an acre. And then there is the large yield per acre of the O. A. C. No. 21 barley. It seems to me these particular results stand out very prominently in the results of these experiments.

A MEMBER: Do you find any difference in the feeding value of these mangels, or is that represented in the comparative value?

PROF. ZAVITZ: The feeding value is not represented in the results here presented. There is some difference in the feeding value of the mangels. We find the globe slightly richer than the intermediate, and the intermediate slightly richer than the long red.

A MEMBER: What kind is the best keeper?

PROF. ZAVITZ: There is not very much difference in that respect. The Yellow Leviathan is a very fine variety. It is a good shape, compact in form, a splendid keeper, and is good in feeding quality. I don't know of any mangel in Ontario at the present time, taking everything into consideration, which is likely to give better results than the Yellow Leviathan. I might say we have been doing something in the growing of mangel seed in Ontario. Nearly all our root seed is produced in England and France and Germany, and brought to this country. There is very little produced here. We have grown mangel seed for several years, with very good results. The last two years thirty-five varieties of mangels have been grown here. We have found that our home-grown Yellow Leviathan mangel seed is giving a greater percentage of germination than that of any one of the thirty varieties of mangels that have been imported from Europe either directly by ourselves, or through the American or Canadian seed trade.

A MEMBER: How does the sugar beet compare with the mangel for feeding quality?

PROF. ZAVITZ: In each of two winters, Prof. Day conducted experiments by feeding both sugar beets and mangels to milch cows, and kept a careful record of the milk produced from each class of roots. He found that for milk production there was practically no difference shown by the two classes of roots. A ton of mangels would produce as much milk as a ton of sugar beets. The sugar beets are, however, considered to be more fattening than the mangels.

A MEMBER: Will your home-grown seed produce as good mangels as the imported seed?

PROF. ZAVITZ: Yes, we have obtained really a better, a purer, and a more uniform type of mangels from our home-grown seed than we have from the imported seed. And it is just a question in my mind, if it would not be an advantage for a number of farmers over Ontario to grow mangel seed for their own use, by simply saving a few nice roots, planting them out in the spring, and growing mangel seed for their own use.

A MEMBER: Are these varieties better than the Jumbo turnip?

PROF. ZAVITZ: Yes, these are two of the best varieties of turnips we have. The Carter's Invicta is one of the very largest yielding varieties we have at this place.

A MEMBER: Why are field carrots not being grown as much as they were?

PROF. ZAVITZ: Carrots require a large amount of labor. Mangels are more satisfactory. The mangel crop is increasing rapidly, and I think the mangel crop is largely taking the place of carrots.

A MEMBER: Which is the best turnip on a light sandy loam?

PROF. ZAVITZ: On a light sandy loam I don't think there is anything better than the Carter's Invicta. I might say that it is a desirable turnip for shipping to the American markets for table use. A great many turnips are shipped from Guelph to the New York, Philadelphia, and Boston markets for table use in those Eastern cities, and I have, working in my department each summer, two men who in the winter are looking after the shipping of roots from Guelph, and are quite familiar with the different roots they get, and they place

this Carter's Invicta as one of the best for export trade to these Eastern cities. Not only is it a large yielder, but it is also a root of good quality.

A MEMBER: Is it proof against lice?

PROF. ZAVITZ: No; I don't think we have any turnip that is proof against lice. If you have a comparatively warm autumn and rather dry, there is danger of the lice coming on the turnips and doing a good deal of damage to the turnip crop.

A MEMBER: Do you roll mangel seed before you sow it?

PROF. ZAVITZ: No, we do not. We put in our mangel seed just as we get it. It is a difficult matter to break the mangel cluster without injuring the seed. What we call mangel seed is simply a cluster. If you take what we call a mangel seed and open it you will find three or four or five seeds in that cluster. We have tried in different ways to crush these clusters and liberate the seed. We have not yet found a way to break the clusters and not injure the seed. We could sow our seed more evenly if it could be satisfactorily separated from the husks. I have never known of any successful way of doing it.

A MEMBER: Is it any use to soak the seed?

PROF. ZAVITZ: We have soaked mangel seed for 2 hours, 12 hours, 24 hours, and 36 hours. We find that if we soak mangel seed for 12 hours we get rather better yields than we obtain from the dry seed. It assists in the germination of the seed.

A MEMBER: Did you dry it again?

PROF. ZAVITZ: We simply dried the seed sufficiently for sowing. I would sow the seed as soon as possible after it was soaked. This, I consider, very important, as the soaking would likely do more harm than good if the seed were dried afterwards.

A MEMBER: Which corn do you recommend for light land in Ontario county for feed production?

PROF. ZAVITZ: I should think the White Cap Yellow Dent would give very good results. I might say if you get a good variety of corn one year, try and get seed from the same source another year. We have been experimenting the last two years with the same variety of corn obtained from different sources, and we find there is a great difference. As the result of the growers selecting seed on their own farms for a few years, we find that by comparing these strains there is a difference in the yield per acre and in the earliness. I would suggest that you try the Early White Cap Yellow Dent. If you were farther South, you could use the Late White Cap Yellow Dent. There is considerable difference in the time of maturity of different strains of the White Cap Yellow Dent corn.

A MEMBER: Would you advise mixing big and little corn together when growing for the silo?

PROF. ZAVITZ: I can't say that I would. The big corn would likely be late and immature with a large amount of leaf and stalk and not much grain, and hence it would be poor in quality. The small variety of corn would be shaded to a certain extent by the large variety, which would considerably hinder its proper development, as corn requires sunshine. I would prefer planting pure seed of a variety of corn which has a good record for giving a large yield of crop of good quality, and which would be right for the silo at the proper time.

A MEMBER: Would you recommend a flint corn for the silo in preference to a Dent variety?

PROF. ZAVITZ: It depends a good deal on the locality. Generally speaking,

I believe I would prefer the Dent corn for the silo. It has the straight single stalks free from succors, is easily handled, and gives a good yield, and some of the Dent corns are early in reaching maturity.

A MEMBER: Would you prefer home-grown seed to seed from farther South?

PROF ZAVITZ: Yes, I would prefer seed grown here in Ontario. We know better what we are getting. Take, for instance, the Longfellow corn, and we find there is a marked difference in the seed obtained from different sources. The corn we have obtained from Essex has surpassed the Longfellow corn obtained from the Toronto seedsmen every single season for five or six years. Every year the Essex variety has given a greater yield of grain, a little less total yield, and it is earlier in reaching maturity.

A MEMBER: Do you recommend selecting seed from your own crop year after year?

PROF. ZAVITZ: Yes, I do, especially for grain production. If corn is grown entirely for the silo, it is sometimes better to buy the seed a little to the South, or from lighter land, where the seed can be thoroughly matured. We usually get the seed corn for the College farm from Essex county. We can get through that source grain which is well matured and good in quality. It is difficult to produce good ripe seed of the silo corn here at the College, except in occasional years. In two out of the past four or five years the College has used seed produced here on the farm for planting the large areas of silo corn with excellent results.

A MEMBER: How much per acre would you sow?

PROF. ZAVITZ: It depends upon the variety, but we aim to have the plants ten to twelve inches apart in the rows and the rows forty inches apart. When in squares, we plant forty inches apart both ways and have four plants per hill.

A MEMBER: Would you advise letting the corn freeze before it is taken in?

PROF. ZAVITZ: No, not if I was growing the right kind of corn. I would aim to grow the corn that would give the best results, that would reach a good stage of maturity in the field before the frost would occur. But if I were foolish enough to grow some big late variety of corn that was quite green and immature at the time I wanted to put it into the silo and contained such a large amount of water that it would make sour silage, a little frost would probably help in reducing the water in the corn and thus enable it to cure better in the silo. You need to reduce the water in that very immature corn in some way. There are two ways to do it. One is to allow the corn to freeze and leave it standing for a few days, and the moisture will soon decrease. Another way is to cut the corn and place it on the ground for one or two days and allow it to wilt. That would reduce the amount of water also. I consider it unwise to grow such late varieties of corn that it is necessary to reduce the water either by freezing or by wilting.

A MEMBER: Would you advise early sowing in the spring?

PROF. ZAVITZ: I advise getting the corn in as early as the land is warm enough and when the danger from frost is past.

A MEMBER: What is the best individual result in each case from the fertilizers?

PROF. ZAVITZ: There are so many experiments, I could not answer that question definitely without spending some time in an examination of the results. In some instances, certain fertilizers have more than doubled the yield of the crop.

A MEMBER: Do you experiment with salt?

PROF. ZAVITZ: We expect to include salt in connection with our co-operative experiments with mangels next year. Salt acts as a stimulant on the ground, and you know that stimulants are not usually essential.

A MEMBER: Do you ever use any other but cow manure?

PROF. ZAVITZ: We recommend that cow manure be used entirely in these experiments in order to keep the conditions of the different tests as uniform as possible.

A MEMBER: What is the best time to manure for mangels?

PROF. ZAVITZ: Usually at the time of sowing the mangel seed in the spring. In connection with these co-operative experiments the fertilizers were all applied at the time of sowing the seed, except nitrate of soda, which was applied after the mangels had reached a height of two or three inches.

A MEMBER: Are the results of fertilizing better on poor land than on rich land?

PROF. ZAVITZ: We sometimes find that on fairly rich land there may be some one constituent lacking, and a single fertilizer might thus increase the crop a good deal. I believe it is an advantage often to use farmyard manure and to supplement that with some fertilizer. In order to know which fertilizer to use, these tests should prove very valuable. The poor land is particularly benefited by farmyard manure. The application of one single fertilizer will sometimes make a very great difference to the crop if we can ascertain by experiment just which fertilizer is the most deficient in the soil. If only one constituent is lacking in the soil, it might be extravagant to use a complete fertilizer or farmyard manure entirely.

PROF. HARCOURT: Just before closing the discussion on fertilizing, there is one point, I think, that we could do well to bring out, and that is that these fertilizers must always be looked upon as supplements to farmyard manure, and never looked upon to replace farmyard manure. Because, if we do, we will meet with failure—nothing surer. Each man must find out what his soil and crops particularly need, and then apply that one or those two constituents that may be needed to supplement the farmyard manure. But, if he has carried out some such experiments as outlined here, then, in addition to his regular manuring, he will know what to use, and will thus be able to cut down expenses. The fertilizers are a supplement to balance up his soil and to add that particular part which the crop needs.

The best economical results are always got on the crops which need the most work. And, therefore, it is our hoe crop on which we look for the greatest returns from the fertilizers. They draw heavier on the soil than do the cereals or the forage crops.

A MEMBER: How do you apply these fertilizers—with a spreader?

PROF. ZAVITZ: In a small way, we apply the fertilizers by hand. Of course, when there are large quantities used they are generally applied with machinery.

There are a few things I wish to emphasize strongly. We see, from the results of the co-operative tests, the influence of these fertilizers on various kinds of farm crops. Even in oats we see an increase of ten bushels per acre. It impresses upon us the great importance of taking greater care of our farmyard manure by saving it all. When we see the influence of these fertilizers on our soil, it suggests the importance of looking well after our manure piles. It also indicates the value of making use of leguminous crops; such as clover, alfalfa, peas, beans, and crops of this kind. A knowledge of the results of these fertilizers with various crops on different soils throughout the Province must furnish most valuable information to those who conduct the experiments. It enables the farmers to understand the soils on their own farms much better, and to thus be in a position to handle them to much greater advantage.

A MEMBER: Do you think it is wise to spread manure in the winter?

PROF. ZAVITZ: I think there are many cases in which it is a good plan to spread the manure on the land in the winter. Many of our best farmers are now handling their manure in this way. One needs, however, to use good judgment in this as in many of the other operations of the farm.

A MEMBER: Don't you think a great deal washes away when it is spread on snow?

PROF. ZAVITZ: If the snow is not deep and the land is level, there is not so much danger. In England, where the winters are open, there is more danger from loss than there is in this country.

A MEMBER: Do you think we get more weed seeds that way?

PROF. ZAVITZ: I don't know just exactly to what extent the weed seeds can be killed in the heating of manure. In order to heat the manure so as to kill the weed seeds, I think there would be a danger of the manure becoming fire-fanged, and that would cause a very great loss of nitrogen from the manure. Try and keep the weed seeds out of the manure, and then there is not much trouble.

RESULTS OF CO-OPERATIVE EXPERIMENTS WITH FERTILIZERS ON SWAMP SOILS.

PROF. R. HARCOURT, O.A.C., GUELPH.

The report which I have to present deals more particularly with the use of fertilizers, or fertilizer experiments on swamp soils.

In Ontario we have hundreds of thousands of acres of swamp lands which are gradually being brought into a state of cultivation, and very frequently these soils are found to be unproductive, because of the lack of some one constituent or because of poor physical condition. Usually they contain an abundance of nitrogen, but frequently it is not available to the plants as food. We usually find, too, that our swamp soils, contrary to the popular idea, contain an abundance of lime, in fact, some of them have four or five times as much as is found in ordinary soils. Consequently, the great majority of our swamp soils are not acid. In many cases they are unproductive simply because the organic matter is not sufficiently decomposed, and because of the lack of either potash or phosphoric acid.

During the past year we experimented with only one kind of soil, and that was in the County of Dundas. The experiment was looked after by the Agricultural District Representative, Mr. Campbell, and the crop used was potatoes. In this experiment there were three plots: a no fertilizer plot, a plot on which acid phosphate and sulphate of ammonia were used, and one to which acid phosphate, sulphate of ammonia, and sulphate of potash were applied. The experiment was to demonstrate whether this particular soil needed potash or not. The results were as follows:—

Fertilizer.	Value of Fertilizer.	Yield of Potatoes [Bush.]	Value of Crop.	Profit by Fertilizing.
None		96	$48.00	
Acid Phosphate Sulphate of Ammonia	$5.87	96	$48.00	None [$5.87 loss]
Acid Phosphate Sulphate of Ammonia Sulphate of Potash	$10.87	176	$88.00	$29.13

It will be noticed that where no fertilizer was used, the yield of potatoes was 96 bushels per acre. On the acid phosphate and sulphate of ammonia plot the yield was practically the same. These two constituents had no effect whatever on the yield of the potatoes, so that they were applied at a loss. But on the third plot, when potash was introduced, the yield went up to 176 bushels per acre. Thus, after deducting the value of the fertilizers used, a profit of $29.13 per acre was obtained through the use of the three constituents. It is plain in this case that what was deficient in that soil was potash. This style of experiment is a good one to demonstrate whether a soil is deficient in potash or not. It could also be used to illustrate whether the soil was deficient in phosphoric acid. Another style of experiment that is well adapted to bring out the needs of the soil is as follows:

Plot I.—No fertilizer.
Plot II.—Complete fertilizer, consisting of:
Nitrate of soda,
Acid phosphate,
Muriate of potash.
Plot III.—Nitrate of soda,
Acid phosphate.
Plot IV.—Nitrate of soda,
Muriate of potash.
Plot V.—Muriate of potash,
Acid phosphate.

It will be noticed that all three constituents were used on one plot, and then in turn on Plots III., IV., and V., one of the constituents was dropped out of the experiment. Such an experiment will show which one of the plant food substances is the controlling factor.

Such an experiment shows more definitely the needs of the soil than can be obtained from a chemical analysis, and when properly carried out gives the experimenter definite information as to whether it will pay him to use fertilizers on that particular soil.

RESULTS OF SEED INOCULATION WITH LEGUME BACTERIA.

Prof. S. F. Edwards, O.A.C., Guelph.

The work in the distribution of cultures of legume bacteria for the inoculation of seed was begun by Harrison and Barlow in 1905, and has been continued each season since, the method as devised by these workers being still used with

slight modifications. Briefly, this method is as follows: The cultures are grown on ash-maltoseagar slants in one and one-half ounce bottles, known to the trade as wide-mouth blakes. When growth is copious, the bottles are enclosed in a paper mailing case with directions instructing the farmer to mix the contents of the bottle with a pint and a-half of sweet skim milk or whey, to mix this suspension thoroughly with a bushel of seed and to sow at once. In the autumn, a blank is sent to each recipient of the cultures asking him to report as to whether the inoculation of the seed has been of any apparent benefit to his crop. These reports are carefully gone over, and, in compiling the season's results, consideration is given only to those reports which, so far as we can judge, show care on the part of the farmer in conducting his experiment and reporting his results. A summary of these reports since the inception of the work in 1905 to the present time follows:—

SUMMARY OF RESULTS IN SEED INOCULATION, 1905-1910.

Year.	Total Cultures sent.	Total Reports received.	Inoculation beneficial.	Inoculation not beneficial.	Others *	Per cent. favorable.
1905	246	134	91	40	3	67.9
1906	375	144	72	48	24	60.0
1907	372	187	67	57	63	54.0
1908	2,113	699	397	237	65	62.5
1909	2,017	494	211	161	122	56.7
1910	3,375	771	344	179	248	65.8

*Figures in this column not considered in computing the percentage favorable.

The average of favorable results for the six years is 60 per cent.

During the autumn just passed, we sent two hundred and fifty supplementary blank reports to as many farmers who had tried seed inoculation on alfalfa and red clover seed in 1909, asking whether there was any difference in the crop from the inoculated and uninoculated seed during the present season. Of these blanks, 171 were returned, 130 for alfalfa, and 41 for red clover. Of these, 62 per cent. of the alfalfa and 63 per cent. of the red clover showed an increase in the crop through inoculation, variously stated at from 10 per cent. to 50 per cent.

Of these reports of increased crop in 1910 from seed inoculation in 1909, 12 per cent. of the alfalfa and 15 per cent. of the red clover showed no difference in the inoculated and uninoculated portions during the season of 1909.

In view of these results, we feel that seed inoculation is practicable and that the increased encouragement of the farmer to give leguminous crops a larger place in his rotation makes the work worth while.

REPORT ON CO-OPERATIVE FORESTRY.

PROF. E. J. ZAVITZ, O.A.C., GUELPH.

During the last season the Forestry Department distributed or planted about 400,000 trees. About 200,000 were sent out to private planters, and some 200,000 were planted at the Norfolk Forest Station.

The material sent out to co-operative planters consisted largely of Scotch Pine, White Ash, White Elm, Sugar Maple, Soft Maple, Catalpa and Black Locust. A number of planters received Walnuts, Butternuts, and Hickory Nuts, to be used in planting in woodlots or plantations.

Under the direction of the Schools' Section of the Experimental Union there was sent out sixty collections of forest tree seedlings.

This department has during the last five years sent out to co-operative planters and planted on Government land nearly two million forest trees. We have plantations started in about forty counties, although most of the planting has been done in the south-western portion of the Province.

As a five-year-old plantation does not mean very much from the standpoint of lumber or cord-wood, I will not be able to give you comparative tables of yields. From reports, I find that from 80 per cent. to 95 per cent. of the trees are living, which is considered a good percentage in forest planting. Plantations in light or thin soils, such as we are dealing with in Ontario, give very slow results in tree growth the first few years. First year after planting, the height growth averages 3 to 8 inches. Fourth year after planting, a number of our plantations are growing from 12 to 24 inches per year. As soon as the trees are large enough to shade out the grass and protect the soil, growth becomes more rapid.

For the coming season this department will have for distribution plants of the following kinds: White Pine, Scotch Pine, White Cedar, Black Walnut, Butternut, Hickory, Sweet Chestnut, Red Oak, Maple, White Ash, Elm, and Black Locust. We have this year a larger number of hardwoods and nut trees, which should prove valuable to those who desire to re-stock thin woodlots.

In waste land planting it is not always possible to use the trees we might wish. On poor soils some of the evergreens give the best results, and are, in fact, about the only kinds which it is possible to grow. The problem in old Ontario is not only to re-forest the non-agricultural soils, but to endeavor to plant hardwoods and nut trees wherever possible. The better classes of hardwoods, as ash, oak, elm, etc., are going to become very scarce. At present we depend largely upon importations from the United States. It is absolutely certain that this source will soon be closed; as we are told by good authorities that the end of the virgin hardwoods of the United States is in sight. It will simply mean that hardwoods will be out of the question for the ordinary citizen, and that he will have to be satisfied with inferior woods.

One of the chief branches of work claiming the attention of this department is the Forest Station in Norfolk County. At present there is 1,300 acres of land in this Station. The two main features of this Station are experiments in the reclamation of waste land by *forest planting* and *forest nursery work* to produce material for local planting, as well as supplying forest seedlings for general distribution throughout the Province.

During the last season we had about 200,000 plants planted at this Station, consisting largely of White Pine, Scotch Pine, Jack Pine, Walnut, Butternut, Red Oak, Chestnut and Black Locust. These plantations will not only be of value locally, but are good tests of methods which may be adopted in future consideration of this work in other parts of Ontario.

The forest nursery at this station is located at the border of the poor lands. The soil has been badly depleted, but is being brought back into fertility. At present the depleted condition of the soil and the prevalence of weeds has made good nursery practice difficult, but every year will see an improvement in this

respect. In connection with our forest nursery work, we are experimenting with field plants best suited for green manures on this light type of soil. The plants used up to the present have been rye, buckwheat, vetch, cow peas, lupins, and spurry. This phase of the work should prove of value, aside from our own local problem. There is need for a wider knowledge of the uses and value of certain plants as green manures, where agriculture is being pursued on light sandy soils.

In the forest nursery there is at present about 800,000 forest plants in nursery lines and about 1,500,000 seedlings in seed-beds.

RESULTS OF THE CO-OPERATIVE EXPERIMENTS ON THE CONTROL OF SWARMING.

Morley Pettit, Provincial Apiarist, O. A. C., Guelph.

The Apiculture Division of the Agricultural and Experimental Union was established in 1889. The first co-operative work done by it was in 1891, under the direction of Messrs. Holtermann, Husband, and Haight. An experiment on the use of comb foundation in sections was sent to twenty-four beekeepers. Twelve reports were received that year. The experiment was continued in 1892, but was not reported. In 1893 a self-hiving device for swarms was sent to twenty-five experimenters. Eleven reports were received. In 1894 the experiments were continued with the self-hiver, and some five-banded Italian queens were distributed for testing. In 1895 nine reports were received on the merits of the five-banded Italians. No co-operative experiments were conducted from that time until 1910.

At the beginning of that year the Apiculture department was organized at the Ontario Agricultural College for instruction and experimental work. Steps were immediately taken to conduct co-operative experiments. A prospectus and application blank were sent to the mailing lists of beekeepers. In this it was stated that for the present at least, not material but methods would be distributed, and that the first method to be tested would be one for the control of swarming. Applications were received for this experiment from over three hundred beekeepers representing nearly every county of Ontario, as well as most of the other Provinces.

This most gratifying response can be attributed partly to the wide-spread interest there is at present in the work of the Experimental Union, partly to the interest in beekeeping as a business which is awakening all over the country, but more especially to the fact that the particular experiment announced, "The Control of Swarming," is one in which every progressive beekeeper is interested.

There are three great problems in bee-management in this country, viz.: Brood Diseases, Wintering, and Swarm Control. While the first two are very real, the swarming problem comes home to every beekeeper whether he realizes it or not. If his bees build up strong enough to gather a good crop of honey they are sure to develop the swarming impulse if left to themselves. If he cannot control this impulse to swarm, the beekeeper must either spend a great deal of time watching for and hiving swarms, or else lose enough swarms to take the profit off his bee business. If he had any other work, the swarming is more than likely to take place at the most inopportune times, *e.g.*, when he is busy in the hay field at the back of the farm, or when he is on his way to church. Now all this is very expensive and quite unnecessary.

There is nothing on the farm which requires so little care in proportion to the returns as the bees. This is why they are so often kept at a loss; because the care they need is so small that it is utterly neglected. They require only a little attention, but what they do require they must have. It is to call attention to this small amount of work, and to help fit it into its proper place among the other farm duties, that these co-operative experiments are undertaken.

The management of an apiary for honey must be approached in the same business-like manner as the management of a dairy herd for milk. There is no more "luck" or "chance" in the one than in the other. Scientific principles govern both. Failure in either is due to some definite cause, which must be discovered and mastered before success can be attained.

One first principle in handling any live stock is to be master of the situation. One cannot get full value from a horse until it is completely under control. It is the same with bees. To be a successful beekeeper one must be a "Bee-master"; not in any cruel sense any more than with a horse. To manage a horse one must know a horse from A to Z. To manage bees one must study their habits and disposition, and learn as far as possible why and how they do things. This takes time, but it is time well spent.

Experimenters were fully warned of the difficulties connected with this sort of experimental work. Because of the great number of variable factors to be considered, experiments in Apiculture are of necessity quite complicated. The necessary equipment, however, is very simple, consisting of a good smoker to control the bees, a veil to protect the face, a hive-tool of some sort for prying loose frames or supers, and a quantity of empty combs or wired frames with full sheets of foundation. It is necessary also to have an average of at least two extracting supers for each hive.

To control swarming, one must inspect the bees often, so as to know their condition all the time. This requires system. Here again a comparison may be drawn. Other live stock require attention two or three times a day, seven days in the week, 365 days in the year and 366 days in Leap Year. It is different with bees. We don't have to feed them or groom them, or milk them or gather their eggs, we don't have to clean their stables or fumigate their coops, or give them a ball or a drench; but we *do* have to give them *some* attention regularly, and as certain hours are set aside for the feeding and milking, so a certain day in the week or a part of that day, should be set aside for the apiary work.

For the experimental group, an even number of colonies is chosen, preferably not less than ten nor more than twenty. They should be as nearly uniform as possible in every way, having reference to quantity of bees, brood, and honey, race of bees, age of queens, style and color of hives, etc. The group is divided into two equal uniform lots, styled Lot A and Lot B. Throughout the whole season lot B is managed the same as the experimenter would have managed all his bees if he had not heard of the experiment. Lot A. is managed according to instructions.

Let us suppose that Monday is "Apiary Day." On the first fine Monday in April or May the hives are overhauled and the experimental group chosen, and divided into the two lots. Every Monday after the beginning of fruit-bloom each colony of lot A is examined to note the progress of its development, and give necessary treatment. As soon as each brood chamber is full of bees an extracting super is put on. All strong colonies should have supers in fruit-bloom. As the strength of each colony increases the entrance is enlarged, until about the beginning of the clover flow in June, when all, except weaklings, should be given an

entrance the full width of the hive and an inch and a quarter deep. At that time each colony should have a super, and before it is half-filled with honey another placed between it and the brood-chamber.

There are two things which one must learn in order to control natural swarming:

1. *The conditions which usually cause it.* These must be learned so that when one sees them one will know that the bees are almost sure to get the swarming impulse soon if they have not got it already. When found they must be removed as far as practicable.

2. *The preparations a colony generally makes before it swarms.* When those are known in every stage, the apiarist must know, at whatever stage he finds them in a hive, what to do to stop them and keep the colony contentedly at work without swarming.

There must be no confusion between preparation for swarming and causes of swarming. Preparations are not causes. To hinder preparations without removing causes is useless. To remove causes after preparations are well under way is not nearly so satisfactory as to prevent the causes even before they occur.

Some of the *causes* of swarming are the following: A crowded condition of the super or brood-chamber, a continuous but slow flow of nectar, too much hot sun and not enough ventilation for the hive.

The *preparations* for swarming are as follows, and in the order named: Drone brood, queen cell cups, eggs in cell cups, larvæ in cell cups, capped cells.

The method of management to prevent natural swarming consists in judiciously from week to week studying the condition of each hive, as a doctor studies each individual patient, and letting alone or giving treatment as each case requires. Experience enables one to do this rapidly and without the detailed examination which the novice must use. A knowledge of the habits of bees is necessary, and will be acquired by this work. For example, bees never prepare to swarm when there is no honey coming in. Bees never try to rob when there is honey coming in. Yet one experimenter displayed his ignorance of these facts by stating that he was some times prevented from examining all the hives for the swarming impulse by the bees trying to rob. A doctor might as well say he could not examine a child for infantile paralysis because it was running about so that he could not catch it.

In the weekly examination when conditions which would cause swarming are discovered, they must be removed or counteracted in some other way. When preparations for swarming are found, the factors known to be opposed to swarming must be increased, and the preparations removed if far advanced.

The essentials for swarm control are room, ventilation and shade, given in time. These all can be given in various ways which are fully described in the circular of instructions sent to experimenters.

Reports on the experiment were received from sixty-two beekeepers, and a number of others wrote saying that for one reason and another they were unable to take up the experiment this year, but would be in better shape for the work next year.

The ones who reported are pretty evenly distributed over Ontario and represent all classes of beekeeprs, from the one-hive man to the man with 250 hives. The figures show a marked increase in the number of hives kept by them. In spring, 1909, they aggregate 1,774 hives, an average of 28.6 hives each; fall, 1909, aggregate 2,384 hives, an average of 38.5 hives each; spring, 1910, aggregate 2,155, an average of 34.9 hives each; and fall, 1910, aggregate 2,991, an average of 48.3

hives each. Thirty-seven experimenters began the season of 1910 with not more than 25 hives, fourteen had between 25 and 50 hives each, five had between 50 and 100 hives each, and six had over 100 hives.

The style of hives most commonly used is the 8-frame Langstroth; thirty-six experimenters used this style. Ten used the 10-frame Langstroth, five used the Richardson hive, three the Jones hive, and eight used miscellaneous varieties, mostly of their own make. Thirteen said they were not satisfied with the hive they are using, and if starting again they would choose a larger hive of standard make, nine choosing the 10-frame Langstroth, three the 12-frame Langstroth, and one the Richardson.

As to the race of bees, the Italians are given the preference. Forty-nine experimenters have Italians and their crosses, eleven have Blacks and two Carniolans. There is as much room for difference of opinion about races of bees as of other stock, with the exception that some races are more subject to certain diseases than others. Take for example the disease called European Foul Brood, which is epidemic in some sections of Ontario. Only certain strains of Italian bees can resist this disease. The black bees which unfortnately are so commonly kept by the rank and file of beekeepers, are simply wiped out of existence in such sections of the country, while the Italians of the right strain are piling up large crops of honey.

The honey crop reported by experimenters for 1909 is, in the aggregate, 128.621 lbs., a per-colony-spring-count average of 72.5 lbs. For 1910 it is, 197,533 lbs., a per-colony average of 91.3 lbs.

This increase can be accounted for partly by the fact that the season of 1910 was some better than that of 1909, and partly by the increased attention given to the bees because of interest aroused by the experiment.

Unfortunately, a number of the best beekeeprs failed to complete the experiment because their method was the same as the one described. This has unavoidably reduced the average returns from the Experimental groups, which are given farther down in this report.

One thousand seven hundred and forty-nine pounds of beeswax was reported, an average of .81 pounds per colony. This is an important by-product of honey production which is largely neglected and wasted. The process of rendering it into commercial form presents some difficulty, but this may be cheaply overcome; and the result is worth from 30 cents to 50 cents per pound.

It is encouraging to see the interest taken in this work by the younger beekeepers; thirty of the sixty-two experimenters have had bees for not more than ten years. Then there are fourteen from 11 to 20 years, ten from 21 to 30 years, and eight have had bees for over 30 years.

With reference to the difficulties encountered in their bee work, the one most frequently noticed is that of *Wintering*. Twenty-two experimenters have reported that this is their chief difficulty, eighteen have most trouble with *swarming*, and nine are troubled with *lack of time* to look after the bees. These can likely be nearly all turned over to the *swarming* difficulty, as that is what takes the most time in the busy season. Some are so fortunate as to have no troubles whatever.

About twenty reported that they had a method of their own for the control of swarming. Half of this number have practised a similar method to that described in the experiment. Four experimenters have various methods of dividing colonies when they get nearly strong enough to swarm. This method is really artificial swarming, and is not prevention of swarming. It gives increase as well as honey,

but always at the sacrifice of honey. There is no question that "in union is strength," and the working force of each colony should be kept together for best returns in honey. Three experimenters stated that they gave plenty of room at the proper time and have no trouble. This is really all that the method described for the experiment amounts to, except that it includes systematically watching for the proper time to give the needed room both upstairs and down. It also gives a weekly drill on internal conditions of the hive, and a knowledge of the habits of bees, which is so necessary for successful bee management. It is surprising what a number of men have kept bees for years and have never seen a queen bee, and would not know the difference between healthy brood and diseased brood. One experimenter attempts swarm control by removing queen cells and finds this method not always successful. Removing queen cells after they are built is about as good as locking the stable after the horse is stolen.

What might be called full reports were received from twenty-five experimenters. The average number of colonies which these experimenters used in experimental groups is 11.7. Each group according to instructions was divided into two lots, lot A and lot B, having an average of 5.8 colonies in each lot. Of the colonies in lot A, 18 per cent. cast first swarms. Of the colonies in lot B, 38 per cent. cast first swarms. It will be seen from this that while the experimenters could not be expected to entirely prevent swarming the first year, they have met with a marked degree of success in controlling the swarming impulse, reducing it from 38 per cent. to 18. per cent.

As a result of this control of swarming and the extra attention given to the colonies of lot A, the average return in honey was 83 pounds per colony as against 75.3 pounds per colony of lot B. In addition to this there was an average number of seven combs per colony built in lot A, and 5 combs per colony in lot B. Of course those who carried the experiment through, ten experimenters said that the colonies of lot A are in a better shape for wintering than lot B. Thirteen said they could see no difference, and two failed to report on this point.

Perhaps the most interesting part of these results is the report on the benefits derived by the experimenters from the work. Some of these are the following:

"Closer attention and practical experience." "Your method saves half the work." "Much more intimate knowledge of bees." "I do not know; I want to try this again. It is hard for me to drop my own method or to think some other system is better until I try it again." "More interest." "More knowledge." "I have the bees under my own control." "Better knowledge of beekeeping." "More honey for more work." "More system in work." "Increased knowledge." "Learn to systematize." "Saves watching for swarms."

Some who were unable for various reasons to carry out the details of the experiment stated they have received benefit. One man says that he has derived no benefit whatever. He examines the bees in the spring to see if they are all right and lets them alone. It is interesting to note from his report that his returns in honey are far below the average of those who gave their bees attention.

After having made the test carefully according to directions, six experimenters thought their own method was just as good of not better. Two were uncertain and wanted to try it again. Seventeen out of the twenty-five said they very decidedly prefer the method prescribed in the experiment.

Upon the whole, the response has been very gratifying, even though the number of satisfactory reports is small. The estimate of good done by the wide distribution of a circular describing how to control the most unruly impulse of

these faithful workers is not limited to this visible result. Beekeepers were taken by surprise and quite unprepared. Any number of men wrote that by the season of 1911 they will be ready to go ahead with the experiment.

The plan is to send out the same experiment to those desiring it in the spring, and also experiment No. 2, which will be for the prevention of natural swarming in the production of comb honey.

REPORT OF THE SCHOOLS' DIVISION OF THE AGRICULTURAL AND EXPERIMENTAL UNION.

Prof. S. B. McCready, Agricultural College, Guelph.

The work of the Schools' Division of the Agricultural and Experimental Union commenced in 1909, and was continued in 1910 with some new features added. It was felt that the response made by teachers, trustees and inspectors in the first year's operations and the favorable reports received, warranted us in extending the lines of co-operation between the schools and the college. The past year's results have justified the extra expense and labor. Two hundred and thirty-seven schools, with probably more than 12,000 children represented in them, have shared in the distribution of materials, and in a measure joined forces with the Ontario Agricultural College in the field of Agricultural Education. The Schools' Division is the College's extension work with the public schools of the Province. The field is a large one; nearly 500,000 children are enrolled annually in our schools and 10,000 teachers are engaged in their instruction daily.

The Problem of Agricultural Education and its Relationship to the Public School.

The problem of Agricultural Education is the largest educational problem confronting educationists to-day. From all over the world, there are evidences of an awakening in the matter and of attempts at practical solutions. The introduction of a measure of vocational education for country people and country children is a slower and more difficult thing than the introduction of an analagous education for urban dwellers, owing to the stronger, natural conservatism of those who till the soil, and of the more scattered character of the settlement and schools. This is evidenced in the greater progress made in technical training, manual training, etc., in our towns and cities than is shown for agricultural teaching in the country. Urban schools, as a rule, respond to progress and change more readily than rural schools.

So far the meeting of the problem has been restricted largely to the education of the adult population or to young men and women in high schools. For this there is a great variety of measures in operation—short courses, demonstration farms, crop competitions, seed distributions, Farmers' Institutes, Women's Institutes, lecture courses, agricultural High Schools, etc., etc. All the time the larger part of the problem, and, if I may venture to say it, the more important and crucial part of the problem—the teacher and pupils in the schools—remain unsolved and largely unapproached. For if the fundamental education could be adjusted properly and adequately in the schools along proper lines, the necessity

for and difficulty of trying to reach the adults would be greatly lessened. Not that efforts should be slackened to reach everyone and increase the industrial intelligence and efficiency of those who now do the work in our homes, our shops, and on our farms, but that a sound pedagogical view should prevail and be acted upon. The public school and its problem lies at the bottom of all effort for educational advancement. It is the part of wisdom to use the educational machinery that is already in existence, adjusting its levers and wheels to the new directions rather than to attempt to fit in new wheels or to add new cogs to old wheels. Our 10,000 class rooms with their 10,000 teachers and 500,000 pupils should not be overlooked, but, indeed, should be a first consideration in any sound educational policy. Every day they are at their work; every day there is an opportunity for directing the education of our children so as to make for not only better scholars but also better housekeepers, and farmers, and mechanics, and dress makers, and workers of all kinds.

Special Teachers for Rural Schools.

One important step will be taken towards the solution of the problem when the status of rural school teachers is raised through some organization. As they have a special work to perform in the community, and as they must be equipped specially in order to bring the best of education to country boys and girls, they should receive some special recognition as a part of the teaching body. In the High Schools, teachers are known as teachers of English, teachers of Science, teachers of Mathematics, etc. In the public schools of the towns and cities the specialization has gone into the grades and teachers are known as teachers of the Senior 4th Class, or of the Junior 1st Class, etc., and are specially selected for their fitness in a special grade. Why cannot we have our Rural School Teachers recognized—not as the teachers who are getting experience so that they may take positions in the towns; not as the teachers who have failed in the towns and sought oblivion in the country; not as the teachers who may be hired at a low salary—but as experienced, progressive, successful, well-paid teachers who are permanently secured as teachers specially suited to work amongst rural communities and make the most out of life there for themselves, their pupils and their parents.

In this connection, an endeavor was made at Toronto last spring to bring about the organization of such a section of the Public School Teachers' Department of the Ontario Educational Association. While the proposal found support from the teachers of rural schools in attendance, the majority of the teachers present—who were urban teachers—voted the measure down. Such an organization will come later when the work of the country school is seen to require a teacher of even greater gifts and equipment than is required in the graded urban schools. Let us have the rural teacher for the rural school! The times are demanding it. It is due our 5,000 rural schools with their 250,000 country school children.

Extension Work with Schools a New Feature of Agriculture College Work.

This work is a somewhat new departure for an Agricultural College. So far as known, no other similar institution carries out practical schemes of co-operation with teachers and school children. It is a source of satisfaction to find the work approved. Several educators in other countries have commended it, and have either adopted it or advised its adoption. Mr. S. Brown, Agricultural Instructor

to the Board of Education for South Canterbury, New Zealand, says, "I have schemes of Nature Study and Elementary Agriculture from every conceivable source, but have not yet come across anything equal to the one outlined by you. I have utilized it to some extent for South Canterbury, as you will see from the copy I am sending you. You will note some departures, but the main idea is, I think, preserved."—Timaru, October 5, 1910.

Mr. Geo. Hilliam, of Selborne College, South Africa, investigating agricultural education abroad for a report to his Department of Education, says: "I can scarce place a value upon the Schools' Division Instruction Sheets for organization, instruction and help, both to teacher and scholar. They have no equal in all my information gathered from the whole Empire. This section goes to the heart of many of our difficulties, and I shall give them undoubtedly first place in my report."—East London, November 1, 1910.

The following list will show the general character of the distribution of material, and also the number of schools which have reported on the work. The whole Province is pretty well represented in the work. Last year there were 117 schools co-operating; this year that number is doubled. Last year about 50 per cent. of the schools reported on the work; the percentage this year is only a little over 18. This is a weakness in our work which we shall try to remedy next year—sending material out only on condition that the teachers repay the Union for its efforts on their behalf by some acknowledgment of their experience. It is only by knowing what is being actually done by the teachers in their schools that we can hope to make our plans effective and progressive. The absence of reports in many cases is likely due to teachers changing their schools, but in many also it must be due to carelessness or to their failure to appreciate the fact that ours is a *co-operative* Union; that for the help we bring to them, they should bring help to us. For some of the material sent out, however, it should be said, no report was expected; for such things as the Bulletins and the O. A. C. Review, for example. For the seeds, tree seedlings, pictures, etc., any report is of a distinct educational value.

DISTRIBUTION OF SCHOOLS CO-OPERATING AND THE NUMBER REPORTING SHOWN IN BRACKETS.

Algoma 1	Lambton .....18 [4]	Renfrew.....3 [1]
Bruce.....19 [5]	Lanark 3	Simcoe .....25 [3]
Brant..... 3 [2]	Leeds 3	Stormont ..... 2 [1]
Carleton ..... 4 [2]	Lincoln..... 3 [3]	Waterloo ..... 9 [2]
Durham 2	Lennox 1	Welland 2
Dufferin 1	Middlesex ..... 5 [2]	ellington ..... 8 [1
Elgin..... 6 [1]	Nipissing 3	entworth ..... 5 [2]
Essex 2	Norfolk 5	ork ..... 6 [1]
Grenville 1	Oxford 3	namilton 1
Grey ..... 5 [1]	Ontario..... 3 [2]	Guelph 6
Haldimand ..... 6 [1]	Perth .....19 [2]	Toronto ..... 5 [2]
Halton 2	Peterborough ..... 4 [1]	*Outside Ontario—*
Hastings ..... 5 [1]	Prince Edward 7	Prince Edward Island ..7 [2]
Huron 5	Prescott ..... 4 [2]	Saskatchewan 3
Kent.....10 [1]	Parry Sound..... 1 [1]	United States 1

The following were offered to the schools this year:

1. Seeds for Children's Gardening.
2. Seeds for Demonstration Plots.
3. Forest Tree Seedlings.
4. Fall Wheats for Comparison Plots.
5. Collection of Agricultural Seeds.
6. Collection of Tree Seeds.
7. Mounted Collections of Weed Seeds.
8. Tulip Bulbs.
9. Climbers for School Improvement.
10. Picture of the College.
11. Schools' and Teachers' Bulletins.
12. O. A. C. Review for School Libraries.

The remainder of this report deals with these *seriatim,* showing how the schools have used the materials, what the effect has been on the education of the children, and how far our scheme solves the problem of introducing some measure of agricultural teaching into our schools.

On the whole, I think it must be acknowledged the scheme is feasible, and deserving of continuance. Its wider adoption is a question of time and of inducing teachers, trustees and inspectors to try the experiment.

(1) Seeds for Children's Gardening. These were sold at two cents a packet. In most cases they were used by the children in home gardening rather than in school gardens, although there is an increase in the number this year that are taking the work in the school grounds. Eight vegetables and eight flowers were included in the selection, adapting them to the eight public school grades.

With the seeds a booklet on gardening was sent out to guide the children and teacher in the work. Another circular was specially prepared as a guide to the teacher in taking up lessons in the school based on the work.

One hundred and seventy-seven schools have co-operated in the work, these representing more than 300 teachers. Most of the schools are in country places, but several town and city schools joined in the work also. Nearly 8,000 children were supplied with seeds.

Usefulness of the Booklet on Gardening. Although the printing and sending out of a small manual, to be used as a guide to the children, entailed considerable expense, it apparently found profitable uses. The following opinions have been expressed:

"The leaflet is a splendid idea."—*Perth Co.*

"The leaflets were useful in all grades of the work. . . . They were helpful to children, teacher and parents."—*Waterloo Co.*

"The children kept it as a reference. It was discussed in class."—*Ontario Co.*

"It was very useful indeed. Excellent instruction was obtained from it."—*Lambton Co.*

"The parents were interested in this, and not only explain to pupils, but learn themselves."—*Prescott Co.*

"They were useful for supplementary reading."—*Simcoe Co.*

School Garden Reports.

The following quotations from reports of teachers who have taken the work in School Gardens will be found suggestive:

"The trustees supplied material for a fence, which the boys put around the plot."—*Parry Sound.*

"The children were delighted when the time came to go to the garden work."

"The women were interested, the men indifferent."—*Elgin Co.*

"The children found recreation in attending to the garden at noon and recess."—*Simcoe Co.*

"The children enjoyed the work very much, and did better work in school in consequence. Several teachers were interested in the garden, and would like to take up the work on a smaller scale."—*Ontario Co.*

"A neighbor gave us the fertilizer for the garden. . . . The garden work is co-related especially with Nature Study, as it is all Nature Study. Art, Composition, Grammar, and Arithmetic also blended with the work."—*Kent Co.*

"The children entered heartily into the work and were willing to come earlier in the morning in order to work in the gardens."—*Prescott Co.*

"The trustees have bought one-quarter acre of land beside the school ground for a school garden, and we will try it next year. They have thus far drained the land; they will put manure on it and make it ready for next year."—*Waterloo Co.*

"I regret being unable to forward any report regarding our school gardens, owing to the gardens being completely destroyed through the depredations of some parties unknown in the neighborhood."—*Middlesex Co.*

"The garden was nearly destroyed by cattle during the summer holidays. We made a success of what vegetables and flowers remained."—*Simcoe Co.*

"The parents became more interested as they saw how interested the children were, so that now I do not know of anyone in the section who would object to having the garden another year."—*Brant Co.*

"The work was very, very interesting and fairly successful, this being our first attempt. . . . All the children were interested, and some of my dullest pupils seemed to wake up even in their other work. I have talked with several teachers who had not thought of a garden, and they intend having one next year if the trustees are willing."—*Lambton Co.*

Reports on Home Gardens.

For most schools it is advisable to introduce the work by having the children carry on their gardening at home. While the children's experience cannot be used to such good advantage in the school work, it enables the teacher to get experience with the project and to obviate failure in school garden work afterwards. In many cases the home gardens are supplemented by a few garden plots at school. We look forward to the time when every rural school in Ontario will carry out some simple experimental work in the grounds.

The high educational value of the home gardening receives sound support in the following evidence of teachers:

"The work was a benefit to the school. The pupils that do the best work in school were most successful in their gardening operations, and wish to try again next year."—*Hastings Co.*

"Although only a few entered this year, I am certain that almost all wish to have gardens next year. . . . I was agreeably surprised with the continued interest shown in the work by almost all who undertook it."—*Bruce Co.*

"I have visited them all once, and most of the children have taken a great interest in the work and have kept their gardens clean."—*Victoria Co.*

"I think the pupils will do better next year than they have this year. . . . One of the mothers told me the other day that she was glad to have the children working gardens of their own, as it kept them out of mischief, as well as for the learning they received from it."—*Ontario Co.*

"I think perhaps we all partly learned the lesson, 'It is worth while to have a plant.'"—*Lambton Co.*

"I visited several of their gardens during June and July, and gave assistance and advice wherever I thought they were necessary. . . . The children on the whole were very much interested in their little gardens."—*Lambton Co.*

"In the schoolroom we cut out pictures of improved back yards from the Ladies' Home Journal and put them on the wall."—*Toronto, Bolton Avenue School.*

"The pupils were enthusiastic in the work. The senior pupils of this school, to the number of twenty-seven, joined the Haldimand Farmers' Excursion to Guelph, and were well repaid by what they saw. The school gardens at the Mac-

donald Consolidated School were of especial interest. I would suggest that special efforts be made by the O. A. C. to have as many children visit the College each summer as possible, as an interest is created which will prove most beneficial. One look at the tidy buildings and the artistic grounds cannot help but stimulate in the child a desire to improve home life."—*Selkirk, Haldimand Co.*

"The girls took a great interest in the best methods of preparing the vegetables for the table. Many bouquets found their way into rooms of sick friends."—*York Co.*

"The seeds were planted in boxes, and the plants proved very useful in carrying out work in Botany for the lower school, high school work."—*Renfrew Co.*

"Some 250 pupils grew the plants from seed and some use was made of the work by teachers in the class work."—*Cornwall.*

"I received several bouquets of nasturtiums from pupils as late as the third week in October from their gardens. . . . One father of a pupil said the beets were the best he ever ate, and Toronto soil is pretty poor—all sand."—*Toronto, Rose Avenue School.*

"The pupils learned more botany than could possibly be learned from mere text-book work."—*Wentworth Co.*

School Fairs.

In a number of instances the teachers who had carried on gardening held fall fairs at their schools at the close of the season. Some of them reporting on this phase of the work say:

"Our Fair is over, and in a way was quite a success. There were about seventy visitors, but only twelve of them were men. . . . We had the school decorated with our mounted plants, our moths, butterflies and beetles. . . . Seven boys entered the contest in identifying weeds. . . . Two of the boys picked out and named the twelve correctly; one got eleven correct, and three others got nine right. . . . Some of the little folks felt badly over the decisions of the judges in the vegetable competitions, but they felt better after Mr. Cullis explained why the largest was not always the best."—*Victoria Co.*

"On the first Friday in October, samples of vegetables and a few flowers were brought to school. Red tickets were given for the best, and afterwards a few bulbs were given to each for winter culture. . . . One pupil of the Junior Fourth class brought a bottle of pickles made by himself from his own onions, as well as samples of the vegetable itself. A little girl in the same class brought some of hers cooked in four different ways, which she had prepared herself."—*Bruce Co.*

"It was the first Fall Fair ever held in a Toronto school. The flower and vegetable exhibits, in view of the great difficulties under which the majority of the pupils worked their garden plots, are worthy indications of just how much may be accomplished. . . . Back yard lots are often cellar diggings, not clean soil; fences are too high, and there are too many trees and too little sunshine."—Toronto *Star, Sept.* 15, 1910.

(2) School Collection of Seeds for Demonstration Plots. This collection included samples of different species of wheats for an agricultural plot; tree seeds, such as walnut, hickory, maple, chestnut, and butternut for a forestry plot; onion seed for a vegetable plot, and nasturtium seed for a flower plot. These different plots were for the four classes of the schools and intended to furnish material for definite lessons in practical nature study. Several schools have made this their commencement of garden work.

Fourty-four schools received this collection.

(3) School Collection of Forest Tree Seedlings. The material in this collection was sent out from the Government Forest Nursery in Norfolk County. It consisted of 12 White Pine seedlings (2 year stock), 12 Scotch Pine (2 year stock), 12 Norway Spruce (3 or 4 years), 12 White Cedar (2 years), with a miscellaneous addition of deciduous tree seedlings.

It was stipulated that they might be distributed to the pupils, if they were not required for the school grounds, after they had served an educational purpose at the school for at least one year. In connection with this, an offer was made to School Boards to provide material for reforesting any waste land that was connected with the school and which could be controlled permanently for educational purposes. Although a few trustees corresponded in the matter, no school took up the work; this line of work with the schools offers a good field for inculcating reforesting sentiments and practices.

Fifty-eight schools received these collections.

(4) School Collections of Fall Wheats. These were sent out in September at school reopening. They were samples of the best varieties of Winter Wheats tested on the College plots, and choice, selected grain only was sent. Teachers were advised to sow a sample of the best local variety with them as a comparison. Through such distributions there lie great possibilities for improving the quality of the seed grown on Ontario farms.

Ten schools received these collections.

(5) School Collection of Agricultural Seeds. This included samples of different kinds of field crops, such as wheats, corns, clovers and legumes, grasses, flax, buckwheat, etc. The intention was to have schools provided with small plots on the school grounds that would furnish material for practical studies on growth, flowering, seeding, etc. A number of town schools received the material and made good use of it.

About forty-five schools were provided with the collection.

"We have plots showing such things as O. A. C. No. 21 Barley, different clovers, sorghum, broom corn, different kinds of fodder corn, and other legumes, all of which we received from the College. Our plots are 10 feet by 4 feet, staked out, and labelled."—*Perth Co.*

"The growing of the grasses and corn proved interesting right through the term, while the sugar cane claimed the attention of all."—*Middlesex Co.*

"The experimental plots in the school ground, showing varieties of cultivated plants, proved decidedly interesting to the whole community. We used the material from them in our elementary science lessons."—*Simcoe Co.*

"We planted the sugar cane, kale and broom corn in the school grounds and had useful lessons on these, as very few had seen these plants growing. The millet, buckwheat, flax, etc., were given to the children of farmers, who planted these and are sowing the seed. . . . We obtained a great deal of pleasure and information from the planting of these seeds."—*Vankleek Hill, Prescott Co.*

(6) School Collection of Tree Seeds. This collection contained a larger and more varied supply of seeds than the collection included in Number 2. It included oaks, maples, fruit tree seeds, hickories, walnuts, horse chestnut, sweet chestnut, etc. The growing of trees from seeds is one of the most interesting lines of garden studies that schools can undertake. It has a great practical value, too, in the problem of reforesting.

Seventeen schools were supplied with these.

(7) Weed Seed Collection. This collection is sold at 25 cents. The seeds included in it represent those covered in the Dominion Seed Control Act of 1905,

the sale of which is restricted in seed grain, clover, etc., as well as some of the more common weed seeds found as common impurities. These collections have been put up specially by the Botanical Department for educational purposes. Teachers have found them useful for reference.

Twenty-eight schools purchased these.

Of this a teacher in Prince Edward Island writes: "I beg leave to report on the very great help rendered by the use of the mounted collection of weed seeds. In different localities during summer vacation by myself and in the neighborhood of the school during early autumn by the school children, several weeds were gathered and identified by comparing their seed with that in the collection."

(8) School Collection of Tulip Bulbs. These were furnished schools for $1.50. The object was to encourage the improvement of school grounds by the planting of a tulip bed. A circular of direction for planting, with a suggested design for the bed, was sent to the teacher. There were 125 bulbs in the collection, including 50 red, 50 yellow and 20 white.

Eleven schools sent orders for these.

(9) School Collection of Hardy Climbers. This collection, like the tulip bulbs, was arranged to help in improving school grounds throughout the country. It included four Virginia Creepers, two Hardy Climbing Roses, and one shrub Hydrangea. The Virginia Creepers were intended for covering unsightly fences or outbuildings, and the roses for adorning the walls.

Thirty-seven schools secured these.

"The vines we got from you are doing well also. The evergreens will be ready to set out in a couple of years."—*Kent Co.*

(10) Picture of the College. This is a picture 12 inches by 18 inches, showing views of the College buildings, fields, class work, etc. It was sent to schools on condition that it be framed and given a place on the school walls. A presentation card was sent with it, to show when and under what circumstances the picture came into the school. An instruction sheet for the teacher was sent with it also, outlining lessons based on the picture that might be taken up with the pupils.

Eighty schools were provided with the picture.

(11) The Schools' and Teachers' Bulletin. These four-page monthly reprints from the College paper are included in the offerings, as through these we seek to keep teachers informed as to advances in the teaching of domestic science, manual training, and elementary agriculture, at home and abroad. We seek to make it as far as possible also an organ of intercommunication amongst all the scattered workers in the field, realizing how isolated teachers in one-teacher schools are. On account of not being allowed franking privilege in the mails for the publication, a charge of ten cents has to be made to cover the cost of postage.

About one hundred teachers are receiving this.

(12) The O. A. C. Review for School Libraries. We aim to have the College paper used as a link between the country school and the College. Through its presence in the school library, teachers, pupils and parents may be led to see the desirability of a higher education for the modern farmer than that which may be provided in the local school. A great many inspectors are in sympathy with this aim and are giving their support to its accomplishment.

About seventy-five schools are on the subscription lists.

"The pupils took the *O. A. C. Review* home for their parents to read, and the boys especially liked it."—*Norfolk Co.*

"The children in the Fourth and Fifth classes read the *O. A. C. Review*. Some of them take it home for their older brothers to read."—*Perth Co.*

"The children enjoy reading different parts of the *Review*. They have discussions amongst themselves on what they have read."—*Waterloo Co.*

"We use the *O. A. C. Review* for supplementary reading, and as a library book to be taken home."—*Kent Co.*

While it must be acknowledged that only a very small fraction of the 10,000 teachers and the 500,000 pupils in our schools are reached in this extension work, so far, it seems to promise a larger adoption in the years to come. Even though our efforts fail to bring the large proportion of teachers into active co-operation with us, through the work done by the few, an impelling change may be effected in a few years in the schools of the Province at large. Certainly a large field lies before us to be worked—all the teachers and all the pupils in the schools! To join these with the College in making for better agriculture and better living is an undertaking to engage one's imagination and efforts.

REPORT ON "IMPORTATION AND DISTRIBUTION OF NOXIOUS WEED SEEDS IN SCREENINGS."

PROF. R. HARCOURT, CHAIRMAN OF COMMITTEE.

For some years we had a committee dealing with the composition and adulteration of feeding stuffs, particularly the mill by-products. Last year the committee were able to report that a Dominion Act, known as "An Act respecting Commercial Feeding Stuffs," came into operation on the first day of January, 1910. This Act makes it compulsory for anyone selling or offering for sale certain prescribed feeds to stamp on the bag, or print on a tag securely fastened to the bag, the guaranteed analysis of the food. This is what the committee were seeeking to obtain, and, having accomplished their object, asked to be dismissed. The meeting, however, decided that the committee be continued, and that they be instructed to look into the question of the contamination of our mill by-products with weed seeds.

The committee learned that the Dominion Seed Commissioner and his assistants were studying this point, and, as they were fully equipped for the work, we decided to wait for their report.

We are delighted to have both the Seed Commissioner and the Minister of Agriculture for the Dominion with us at this time.

GEO. H. CLARK, SEED COMMISSIONER, OTTAWA.

Discussions on weeds are usually considered uninteresting at a meeting of this kind, but the correspondence and appeals from farmers and farmers' organizations that I have received during the past three years lead me to believe that the weed problem, at least in the Province of Ontario, is a very live one. The occurrence of weed seeds in ground feeding stuffs has been discussed at the last three annual meetings of this association.

The greater part of the time at the disposal of our seed laboratory staff is devoted to work undertaken for the purpose of bettering the trade in agricultural seeds. In the summer months, when there are few seeds to test, we have been able to investigate conditions prevailing in some branches of agriculture and com-

merce related to our seed trade, and during the last three years a great deal of attention has been given to weed seeds in feeding stuffs. Most of the weeds that now give trouble in farm crops have been imported with agricultural seeds. With the exceptions of the Ragweeds, all the farm weeds now legislated against have been imported; the Ragweeds were here before Columbus. During the last three years we have imported with agricultural seeds about twenty species of farm weeds that are new to Canada, but of these not more than three or four are likely to give serious trouble.

We do not import feeding stuffs to any extent, but we export them very largely. Our difficulties, therefore, come from within, partly from within the Province of Ontario itself, but in a more general way from within the Dominion as a whole. We have found that these feeding stuffs are an exceedingly active medium for the wholesale distribution of noxious weed seeds from province to province and from farm to farm. In that respect they are secondary only to the seed trade. We have applied restrictive legislation to the seed trade until we have reached the point where I have reason to believe that it is not more harmful to our agriculture than is the trade in feeding stuffs, or, in fact, the careless practices of the farmers themselves, who are ready enough to ask for legislation to be applied to the seed trade and to feeding stuffs, but who seem to take unkindly the application of their own provincial weed laws to themselves. I think it would be unfair at this time further to suppress the distribution of weed seeds in the seed trade until something has been done to restrict their distribution in feeding stuffs. When the farmers themselves have made an honest effort to apply their weed laws in the various municipalities in the Province of Ontario, then, I think, we may consider it expedient and fair to still further restrict the distribution of weeds through feeding stuffs and the seed trade.

Our investigations into feeding stuffs have been made, first, to ascertain the extent to which vital weed seeds are distributed with them; and, second, to procure information as to what practical means may be adopted to restrict their distribution in a way to relieve our farmers of an evil which we know is a greater danger than was supposed before we started the investigation.

Most of the flour mills in the province of Ontario grind some Western grown wheat. Before grinding this wheat they re-clean it to remove the weed seeds. We know of some mills that pipe those weed seeds directly into the bran bin in their whole condition; but most of the mills run the seeds through rollers, for the purpose of crushing them before mixing with the bran. It is quite practicable by the rolling process to destroy completely the vitality of even the smallest seeds; but I am afraid that many of the millers are careless, and while their rollers crush such large seeds as wild oats and wild buckwheat, the smaller mustard seeds escape and are mixed with the bran whole.

Twenty years ago all of the chopped feed available to farmers was ground between stones. During the last fifteen years steel plate choppers have come into general use, and a large proportion of the chopping is now done with them. In the spring of the year, when the farmers' supply of hog and cattle feed is running short, the operators of these choppers find it convenient to purchase feed oats, and occasionally a carload of screenings, to blend with the coarser grains available in the locality, and in that way manufacture for sale a fairly cheap ground feeding stuff. The old stone grinders, when properly adjusted, would destroy the vitality of even the smallest weed seeds; but I do not know of any make of steel plate

chopper that can be operated in a way to kill the finer mustard seeds when they are present in the coarser grains.

Numerous representations have been made regarding the baneful effects of the screenings and feed grain which accumulate about the terminal elevators at the ports on our inland lakes. The farmers of Ontario, much more than those of any other province, have shared in the benefits as well as in the evils of the accumulation of these cheap feeding stuffs within the province. It will surprise many of you to learn, however, that an exceedingly small percent. of the cleanings so accumulated last year were distributed within Ontario. I present herewith a statement prepared at the office of the chief grain inspector at Fort William, showing the total number of cars cleaned, the total dockage or cleanings taken therefrom, and the amount of those screenings distributed in Canada as well as the points to which they were shipped, and the distribution of feed and rejected oats in Eastern Canada in the year ending September 1st, 1910.

1. The total number of cars cleaned for the crop of 1909 at Fort William and Port Arthur was 57,189—all kinds of grain.
2. The total dockage on them was 1,584,072 bushels.
3. The average dockage was 27 bushels 42 pounds per car.
4. Total amount of screenings distributed in Canada—51 cars.
5. The distribution of screenings in each province was,—

Ontario	8 cars
Quebec	41 "
New Brunswick	2 "
Total screenings	51 cars

6. The principal points shipped to were as follows:—

Toronto	3 cars
Mount Forest	2 "
Fergus	1 "
Chapleau	1 "
Suspension Bridge	1 "
8 cars to Ontario.	
Cartier	33 cars
Montreal	5 "
Hochelaga	1 "
Lennoxville	1 "
Chalfont	1 "
41 cars to Quebec.	
West St. John	2 cars
2 cars to New Brunswick.	

7. The number of cars of feed and rejected oats shipped was:—

To Kingston	5 cars
North Bay	2 "
Oliver's Siding	1 "
Charleton	1 "
9 cars to Ontario.	
Cartier	45 cars
L'Islet	2 "
Plessisville	1 "
Montreal	1 "
Scotstown	1 "
50 cars to Quebec.	
Yarmouth	4 cars
Halifax	1 "
5 cars to Nova Scotia.	

In bags to unknown points, 39 cars east of Port Arthur. Total feed and rejected oats, 103 cars.

It will be observed from the above statement that comparatively few cars of this cheap feeding stuff are shipped east of Montreal. The freight charges, perhaps, contribute to make the districts west of Montreal a better market for them, so far as Canada is concerned. These screenings and feed oats have a relatively high value for feed, and it seems to me a question well worth considering whether it is in the best interests of the farmers of Ontario to allow them to be exported to our neighbors to the south, who have been taking practically all of them. I consider it entirely practicable to have them so treated that their baneful weed seed content would be almost nil in the manufactured feeding stuff. However, it is in the best interests of our farmers that those screenings should continue to go to a foreign market until our Canadian manufacturers are able to destroy the weed seeds.

From the viewpoint of the chemist, these ground screenings are exceedingly rich in nutritious properties, but the practical feeder sometimes finds difficulty in inducing his hogs or cattle to consume them. Experiments conducted by Prof. Graham in feeding poultry with weed seeds, which we were able to supply for that purpose, indicated clearly enough that some kinds of those weed seeds are actually poisonous to poultry. So far as I am aware, no definite investigations have been made to determine which of them, if any, are unwholesome to other kinds of live stock. I have not the facilities for making such experiments. These smaller injurious seeds form a very small part of the bulk of the screenings, and can easily be removed before the more valuable feed is ground and put on the market. I have spent considerable time at Port Arthur looking into the methods of handling and disposing of these screenings. At Port Arthur a large sheep ranch is maintained by an American company, who purchase unmarketable refuse and feed it to sheep. I have observed the sheep feeding readily on such seeds as Wormseed and Tumbling Mustard, which have a disagreeable flavor, and which hogs would refuse to eat. I had an opportunity to sample the mutton so produced, and, while it lacked the distinctive desirable flavor of first-class mutton, it possessed no objectionable flavor. A carload of lambs finished on this refuse brought the top price on the Toronto market.

As the result of our investigations, I have come to the conclusion that the greatest evils Ontario farmers have to contend with in regard to the distribution of weed seeds with feeding stuffs come from within the province, principally from the small flour mills and the manufacturers of ground feeding stuffs located in the towns and villages. I have studied the matter as carefully as I could, and have reported my findings to the Minister of Agriculture. I have made recommendations to him as to action which I consider it practicable to take, pointing out, as clearly as I could, the nature and sources of the evils complained of in respect to ground feeding stuffs and the difficulties in the way, from the standpoint of the Federal Government, of dealing with that question by legislation. The Minister of Agriculture is with you to-day, and, while he is here, I am sure he will not expect me to make any statement of what the Government intends to do in the matter.

HON. SYDNEY FISHER, MINISTER OF AGRICULTURE, OTTAWA.

One of the great advantages that a Minister has is to have good men and good experts who can give him the advice and the information which is necessary for the purpose of dealing with complicated matters. In this respect I am particularly fortunate, I think, all through my Department, and, perhaps, in no branch

of it more fortunate than that which is managed by the Seed Commissioner, whom you have just heard. I can say to you that if Mr. Clark makes a recommendation to me, I shall ask Parliament to carry it out, because I have full confidence in Mr. Clark's knowledge, and am fully persuaded as to his ability in regard to the matters with which he has to deal.

While, however, an expert like Mr. Clark has to deal with matters from the expert's point of view, the Minister has to deal with these matters on a little larger and broader ground. In almost every question that comes up in Legislation there are conflicting interests, not only the interests which conflict between one class of people and another, but interests which conflict between different parts of the same class of people. Now, Mr. Clark has pointed out to you that amongst these weed seeds, and the feed which is your part of them, there is a large commerce for feeding purposes. He said that it is a pity that the great bulk of these are exported to the United States. I can understand that there are a large number of stock owners in Eastern Canada who are interested in obtaining as cheap good feed for their stock as they can find, if they can find it is to their advantage to be able to get it at a reasonable price. There is, however, a conflict of the danger to our fields, and our cultivation, and our agriculture, in the distribution of these noxious weed seeds. The question arises, can we get the full feeding value and eliminate the danger? I am informed by those who know more about the details of milling than I do, that to destroy the vitality of all these weed seeds in the feed stuff would be so expensive as to probably unduly enhance the cost of the feed stuff, and that it would be practically prohibition to the use of these feed stuffs if a law were to be passed to absolutely require that all the weed seeds in the feed stuffs should be rendered impossible of growth. Here are the two conflicting ideas and facts, and the legislature has to decide in what way it will meet these conflicting interests. Personally, I consider that the evil in Canada of the distribution of our weeds is so great that I would go very far, very far indeed, in preventing a distribution of these noxious weeds. Going about the country as I do pretty largely, having my eyes open to the farming work everywhere, I think I am safe in saying that, so far as the cultivation of our crops is concerned, the universal prevalence of weeds is the greatest evil that we have to contend with. And, therefore, I say again, I would go very far indeed to prevent the distribution of noxious weed seeds through these feed stuffs, even if in doing so we were to somewhat enhance the cost of a certain portion of our feed stuffs.

Mr. Clark has made certain representations to you into which I will not go into in detail. It is possible, apparently, to destroy the vitality of these weed seeds, that they may be able to get it through doing their grinding operations in a more perfect and complete way than they do now. But here, again, we have the difficulty that if these weed seeds and other grains are ground to become as fine as middlings and shorts that they are not as acceptable to the farmers of the country as if they are only chopped and fed in a coarse way. No doubt, in what is commonly called chop, the weed seeds are not destroyed, and are pretty sure to be vital and grow after they have passed through the animals. There is another difficulty. In the general trade in oats, which are probably as full as any other grain of weed seeds, the demands in the market is for uncleaned grain. The market is peculiar. You would hardly think it possible that men would prefer to buy oats which have a lot of rubbish in them, instead of oats that are pure. But, for one reason or another, they do so prefer them, and if our millers and grain dealers were to clean their oats they would not get an enhanced price suffi-

cient to reimburse them for the money expended in cleaning them. Under these circumstances, it seems almost impossible for us to demand that all oats in the country should be cleaned for sale. And our farmers, unfortunately, and sometimes the small millers who buy the grain for sale, are almost compelled to have these weed seeds in the feed. I wish we could in some way solve this difficulty and interfere to the least possible extent with the commerce and trade of the country.

Now, the Inland Revenue Department at Ottawa deals with the adulteration of foods, with the adulteration of fertilizers; in fact, the Inland Revenue Department has to have a large force for the administration of the law which is left to them. There is a law, passed recently, in regard to the constituent of animal foodstuffs. That law is under the administration of the Inland Revenue Department. That law requires certain definitions and certain purity in these commercial foodstuffs. I am not quite sure, but I think that that law to-day is so worded that it might deal with the presence of weed seeds in these commercial foodstuffs; but I have no hesitation in saying that if it cannot to-day be so interpreted as to govern and control the presence of noxious weed seeds in these commercial feed stuffs I will ask my colleague, the Minister of Inland Revenue, to so amend that law that it can govern and control the presence of weed seeds in commercial feed stuffs. That is a matter which I intend to look into during this session at Ottawa.

I do not want to detain you longer. I have only got to say that we Ministers are only too glad to have an opportunity of obtaining information as to the needs of the people, whether it be in agriculture or in other branches of work. In agriculture, I find that my greatest advantage is to be able to come in contact directly with the men who are minded to undertake the work of the improvement of agriculture in the country. If there is anything in the way of legislation, or anything in the way of administration which can minimize those difficulties I am thereby able better to understand those difficulties and take the necessary steps to go on with the good work. A meeting such as this, and the support of the discussions of the men engaged in the work, is a great help to me. For that reason, if for no other, I would have been glad to come to this meeting to get these helps and suggestions which are so valuable to me.

RESOLUTION.

Prof. C. A. Zavitz: I move that the committee appointed last year to inquire into the importation and distribution of noxious weed seeds in screenings be appointed for the coming year, and that Prof. S. B. McCready be added to the committee.

This is the third annual meeting of our Experimental Union in which this question has been discussed. That there is a very keen interest taken in this matter is very clear by the manner in which it has been discussed by the various farmers, who realize the importance and the seriousness of the question now before this Association. I am sure we were delighted yesterday to know that the Seed Commissioner for the Dominion had been looking into the matter carefully, that the Minister of Agriculture for the Dominion is taking hold of this matter, and that we will likely get legislation along this line. It has been felt by the farmers

throughout Ontario very strongly that so long as the screenings, which contain a large amount of weed seeds, are distributed through Ontario and the Eastern Provinces, a great many weed seeds will be brought to the farms in that way. I believe that the Experimental Union still has some important work to do along this line. We want to have this Committee assist in every way it can. I would suggest that the Committee be asked to write to the Minister of Agriculture for the Dominion, thanking him for the work he is doing and expressing to him the appreciation of the Experimental Union for taking hold of this work during the past year.

The resolution was seconded by Mr. LENNOX, and carried.

SUGGESTIONS FOR A YOUNG INSTITUTE SPEAKER.

G. A. PUTNAM, B.S.A., SUPERINTENDENT OF INSTITUTES, TORONTO.

It always gives me great a deal of pleasure to come back to the O.A.C. where I spent nearly twelve years. My life here was very enjoyable indeed, and I always look upon it as my old home, and for that reason it gives me a great deal of pleasure to come back to meet with you and associate with you in the Union meetings once again, and to see the old boys.

In speaking to you regarding Institute work, it is not necessary to make any apology whatever. We all know that much good has been done through this method of agricultural education, and it is only when you go from place to place throughout the Province that you realize the great good that has been accomplished. When a man comes to you and tells you that he would not have missed a judging class or a certain demonstration for $10 or for $25, as some of them say, then you realize that they do appreciate the work. And when a man tells you that he is growing fields of alfalfa on land which, until recently, was practically useless, and that he was able to do this by taking advantage of what was shown and told him by the Institute worker, then you feel that the work is worth while.

However, we hear in these days that Institute work is not meeting with the success that it formerly did. There is some truth in the statement. In some localities we find that there is not that interest which we would like to see, but from others we get reports which are most encouraging. There has been a slight decrease in attendance at the regular institutes, taking the Province as a whole. However, we cannot measure our success merely by numbers. It is better to send twenty-five men away from a meeting impressed with the importance and the truthfulness of the statements made by the lecturers, than to have an audience of two or three hundred and only amuse them.

My topic this morning is that of Institute speakers, and the topic assigned would lead one to believe that Institute work consisted in delivering lectures, in speaking, and that only. In the light of what has been said recently on public platforms, and statements made in the agricultural press it may be well to change the topic by substituting "Institute Worker" for "Institute Speaker."

THE PROBLEM BEFORE US. There is a growing tendency among instructors in agriculture, both so far as college work, extension work, and institute work are concerned, to emphasize the importance of *demonstration* as compared to lectures and addresses and that only. We cannot have too many examples or illustrations, and in so far as type and conformation in live stock, drainage,

spraying of fruit trees, etc., are concerned, demonstration is certainly the most effective means of giving instruction. We have been following this line of work for several years, and are placing more importance upon it from year to year, as we can get men and money for it. As you all know from the reports of Short Courses in Seed and Stock Judging, which have been held throughout practically all parts of the Province, the farmers appreciate this form of work more than any other line of Institute work that we have taken up. When we bring a body of 500 farmers together, such as we have had at a number of points, and instruct these men in the conformation of heavy and light horses, beef cattle, hogs, sheep, etc., a lesson is given which will certainly have a marked influence upon the agriculture of the district. There are, however, features of agricultural instruction which must always be taught by word of mouth, and for this reason we are convinced that lectures without illustrations, and followed by discussions, will always form an important feature of agricultural instruction.

The lecturer should, so far as is possible, have illustrations bearing upon the topic under discussion. The man who is lecturing upon the improvement of the dairy herd should use a chart containing records following judicious selection and care. The man who is lecturing upon seed improvement will do well to have figures displayed before the audience, indicating the improvement in yield and quality by the application of scientific principles to his work. In fact, there are few lectures which cannot be illustrated either by tabulated figures or by illustrations of some sort. The quality of the instruction will in the majority of cases, however, be measured by the ability of the instructor as a lecturer. While demonstration work will continue to grow in importance, the giving of instruction by the straight lecture will continue to hold a prominent place. We have emphasized the practical, and I would say to the student who goes out from the College, that he must have practical experience along whatever lines he intends to give instruction before he can be a success as an Institute worker. Doubtless, after a few years' practical experience following his course, he should be prepared to answer most of the questions that will be asked by farmers, who want to know what he has done, and not what he has seen.

I believe the day must come when the inexperienced institute workers, as well as the men who have been in the work for years, will be brought together and given an opportunity to take say a two or three weeks' course of study in methods of collecting and systematizing the material which they have, and placing the results of their experience in some logical form to present it to the average farmer audience.

My task, however, is to give a few suggestions to the young institute lecturer. In the first place the institute lecturer, especially one who is beginning in the work, should not attempt to give instruction along more than two or three lines, these lines to consist of features of agricultural work in which he has had success; and he must not depend solely upon his own practical experience for the instruction to be imparted, but should fortify himself with the best available literature upon the subject under discussion and be able when the opportunity is afforded for discussion to give not only the results or his own experience and describe his own methods, but also to outline the experience and methods of other successful men. Definite statements should constitute a good deal of the instruction given, and it is well in many cases also to give underlying principles; and when this is done, make an application so far as possible of those principles to local conditions. Experienced workers, as well as the young men, will do well

to inquire into local conditions and practices and adjust their addresses along lines which will likely prove of greatest local benefit and interest.

Make definite statements and suggestions which will likely provoke discussion on the part of the audience. If a speaker has an hour at his disposal, his address should not occupy more than half that time and the balance of the period be given over to discussion upon his address or a question drawer along the lines indicated by the subject or subjects announced for the speaker.

The Institute worker should not consider that his work begins and ends with the address which he has prepared. Much good can be accomplished by private conversation with the individual or small groups of farmers met with before and after the regular session.

The Institute worker who has his eyes and ears wide open and knows when to keep his mouth closed, and when to speak, cannot but be much benefited by coming in contact with the good farmers of the Province who are found in ever increasing numbers in all sections of the Province, which is recognized as having a larger percentage of its farmers working along advanced lines than can be found in any other State or Province on the continent.

The new Institute worker, whether he be young or not, should have had some practical experience in giving addresses along agricultural lines, either in his local Institute or in connection with some other agricultural organization, and even after this experience it is well for him at first to be associated with men of some considerable experience in the regular Institute work, who should be able to give suggestions and advice of great value as the work progresses from day to day. In addition to this there is no question as to the advisability of giving Institute workers the benefit of at least one or two weeks' special instruction in methods of collecting information and preparing it for instruction work.

Many new workers are inclined to go the long way round to arrive at the truth which the farmer is looking for. Go direct to the point which you wish to impress by the shortest route. It is not well, however, to state bald facts one after the other without illustrating or emphasizing in some way. As a general rule, the practical farmer does not want a dissertation on history or the elaboration of underlying principles. When questions are asked, it is well for the speaker in answering to be able to force home his statements by the application of underlying principles, but the mere statement of these principles in an address without giving sufficient time for illustration, statement of fact and results of practical experience is ill-advised.

The Institute worker must not forget that the Institute is an educational institution, and all political, sectarian and partisan questions should be avoided. There is a large field of legitimate work for the Institute and we cannot afford to introduce discussions or make statements upon subjects of a controversial nature which are likely to divide the Institute members. The Institute as an educational factor has accomplished much in this Province, and is destined with possibly some readjustments of organization and methods to accomplish still greater results.

Now the young worker must be an educator, and not an agitator. If you find that some of your efforts meet with opposition, you must be able to size up the situation and so continue your address that there will not be a feeling of unrest left among the farmers, and it is not necessary, as some of the Institute workers appeared to think in the years gone by, to resort to the anecdote or funny story in order to make a good Institute lecturer. Some who attempted this at the beginning have given it up altogether, and have consequently done better work.

True, you can introduce a story which illustrates a point very forcibly, and the men who can do it well may attempt it, but don't attempt it unless you are sure.

No one man can answer all the questions that are asked at Institute meetings. No one man can cover the whole field of agriculture. Many apply to be placed on the Institute staff, and when we inquire what lines of farming they are prepared to speak upon, they say "All kinds of farming." These men are not engaged as Institute lecturers. I know that the Institute lecturer, if he is to be successful, must be free to admit when questions are asked that there are many of them that he cannot answer; but he should be able, as far as possible, to direct those people where they can get the information desired. But when he does know and can give the information, he must answer fearlessly, be sure of his ground, and speak to the point. Young men are at a disadvantage in appearing before an audience of farmers. The moment a young man goes on the platform, he is discounted by about 25 per cent.; and if he can manage some way by which he will look a little older he is that much strengthened. He must be a man of character and good standing in his own community. It is quite surprising how a man's success or failure as an Institute worker travels from one end of the Province to another. The report of his successes or failures reaches the farmers in other localities before he gets there. So he must make as good an impression as possible all along the line, and he must be an outstanding success in his special line of work or investigation.

The Institute worker must have ability to inspire and uplift to a broader and true viewpoint. Your message to the people must be true, for a false statement will not go with an audience of farmers, it must be logical, and it must be brief, convincing, and believable. Now, there are some agricultural lessons,—some records of cows, some records of improvement in seed growing, and some results of growing alfalfa, which are based upon recorded facts, but which are unbelievable by about three-quarters of the farmers of the Province. And it is a mistake for an Institute worker to overstep anything or even to state the truth, unless that statement is going to be believed by his hearers. Give averages of some of the more striking results, and not outstanding individual successes.

Institute work must be considered in its bearing upon the life and work of the farm, the home, the school, the community, economic and social improvement.

We have set up a rather formidable standard, but you can attain to it.

LESSONS FROM THE STANDING FIELD CROP COMPETITIONS.

J. Lockie Wilson, Superintendent of Agricultural Societies, Toronto.

The question that I am to discuss for a few minutes this afternoon is the expansion of the work of Field Crop Competitions. Had it not been for the splendid work done by Professor Zavitz and his staff of experimenters all over the Province, the competitions in fields of standing grain could not possibly have gone ahead with such rapid strides. While your Experimental Union work has been done on thousands of farms, and you have, I understand, several thousand experimenters, yet it was of necessity carried on in a rather limited way in so far as the size of plots and the grain sown was concerned. The average farmer does not care about doing things in a small way and in the busy season when the

grain for experiment was sent to the farmer he was, perhaps, unable to give it the strict attention that it should receive. Looking into the faces of these scientific farmers in embryo, I think of the wonderful opportunities the future has in store for them. I believe there is no other profession on this continent that is of more importance than ours. I know factories in the Eastern parts of Ontario where men do nothing but use a wrench tightening nuts on bolts all day long year in and year out and so become part of that great machine, and are absolutely useless for any other line of work. But the young farmer has myriad things to interest him and to obtain a knowledge of, and these tend to give him a broader and better outlook. You are undertaking a work that is of vital importance. We are told that the field crops of Ontario are decreasing. I read an article recently, by an eminent gentleman in the City of Toronto, who sent an open letter to the Minister of Agriculture telling him of the great depreciation in agriculture in this Province, and that something should be done to remedy the situation. This writer did not know whereof he spoke. If such were the case, the work of the Department of Agriculture has been in vain. If the gentleman I refer to had taken note of the trend of affairs he would have seen that there is no decay nor shadow of it among the farmers of the Province. We have in Ontario 144,000,000 acres of land in the organized portions of the Province and 14,500,000 acres under cultivation, and we have in New Ontario over 16,000,000 acres that have not yet been cleared. We certainly have a splendid heritage, there is plenty of work to be done by your Experimental Union and the Standing Field Crop Competitions.

I notice in the papers to-day that the Hon. Sydney Fisher has made a statement that the farm crops of Canada had decreased $35,000,000 last year, but the reports and comparative statement which I hold in my hand show that there was an increase in the crops of Ontario in 1910, as compared with 1909. Take for instance, fall wheat—in 1909 we raised in the Province of Ontario 15,967,653 bushels, in 1910, 19,837,132 bushels; barley, 18,776,777 bushels, in 1909, in 1910, 19,103,107 bushels; oats in 1909, 90,235,579 bushels, in 1910, 102,084,924 bushels. The total increase in bushels of grain and roots in 1910 over 1909 is 25,594,508 bushels, and the total increase in tons of hay, clover and fodder corn in 1910 over 1909, 2,021,217. This does not show much slipping backward in Ontario. Notwithstanding that, men say that Agriculture here is declining.

In 1882, I visited the Province of Manitoba and I went through wheat lands there, which are supposed to be the finest in the West. I saw magnificent fields of grain on the Portage Plains. I was there 25 years afterwards and saw heavy crops not of golden grain, but of noxious weeds. We must profit by the experience of the past and fight earnestly for the destruction of these persistent field pests. The best farmers have been going into these Standing Field Crop Competitions. At the Canadian National Exhibition we found in the exhibits of wheat, mixed varieties of that grain, which tend to lessen the value of it for seed. We find in many cases amongst the finest exhibits of oats shown, barley mixed with it, depreciating its value for seed. We have a lot of indifferent farmers both in old and new Ontario. It is for you, gentlemen, the leaders in agriculture in this Country —leaders along the line of better farming to encourage in every possible way the growing of pure seed grain. Much of the seed grain in New Ontario has been imported from these weed-infested districts of the West. Shall it continue? Yesterday, a gentleman who last summer visited Englehart told me that on a farm adjoining that town he saw a bunch of perennial sow thistles nearly five feet high.

The Standing Field Crop Competitions were first inaugurated in 1907 and ten Agricultural Societies entered, and the grant was $1,000 and three hundred and twenty-five farmers took part in it. In 1908 the Government increased the grant to $3,000, in 1909 to $3,500 and in 1910 to $7,000 with 1650 farmers in the Competitions, and 26,000 acres of land were judged by the 62 judges that we sent out from the Department. We have in Ontario 350 Agricultural Societies and a large staff of judges, and these men are doing their work exceptionally well. But, as the years go by, we want more scientific men engaged in this work, and we hope that you will assist us in every possible way to further the work that is being done.

We had 840 bushels of grain from the winning fields in the Standing Crop Competition at the Guelph Winter Fair, and it was said by those competent to judge that it was the best exhibit of grain ever seen on this Continent. The Directors of the Canadian National also offered large prizes for grain and sheaves from these competitions and they were so well pleased with the arrangement of the exhibit last year that they have intimated to me that they will largely increase the prizes offered in 1911. We also had a fine showing of gain at the Ottawa Winter Fair. Over and above the Ontario Government grant the Agricultural Societies put up $5,300 for this competition. The magnitude of our work can be readily understood when you consider that the Field Crops of Ontario alone are of greater value than the combined field crops of Manitoba, Saskatchewan and Alberta. The value of field crops in Ontario last year was $205.000,000 and of this amount our oat crop was valued at over $100,000,000.

Some of the farmers who were first prize winners in these competitions and formerly sold their oats at 50c. a bushel, last year were enabled to sell their whole crop at $2.50 a bushel. There were 5,000 bulletins issued last year giving the names, addresses and scores of the prize winners, and, through these, many large sales of grain have been reported to my Branch of the Department of Agriculture.

"Back to the land" is now the watchword and I trust that the students of this College will go back to their homes as expert leaders in the line of Agriculture. The results already accruing to this Province are great through the efforts of the Agricultural Specialists who are employed by the Ontario Government, and the time is not far distant when every County in the Province will have a graduate of your splendid Institution guiding and directing the tillers of the soil.

THE WORK OF THE CANADIAN SEED GROWERS' ASSOCIATION.

By T. G. Raynor, B.S.A., Dept. of Agriculture, Ottawa.

Its Origin. As some of you may not be familiar with the origin of this association, it may not be out of place to mention the fact that Dr. Robertson, previous to the year 1900, when in the Dominion Government service under the Hon. Sydney Fisher, Minister of Agriculture, was sitting before the fire-place in his comfortable Ottawa home, reflecting on the success of what was known as Meldrum wheat, a spring wheat which had won a medal at the Paris Exposition. He had learned that a Mr. Meldrum, living in the Gatineau Valley, had secured the co-operation of the girls of his family in selecting, about harvest time, the largest and best-looking heads in his spring wheat crop. Sowing these selections and following this practice had made Mr. Meldrum's name famous. As Dr.

Robertson mused before his open grate, he saw boys and girls, 18 years old and under, on Canadian farms, from the Atlantic to the Pacific, going into the fields about harvest time and selecting some of the best heads, the grain from which was to be sown on plots the following year, when selections were again to be made from this plot and for three years in a competition, if only such a scheme could be financed. Then he saw in his vision a millionaire tobacconist, Sir William Macdonald, of Montreal, who no doubt was being enriched by many farmers, and he said, "I will try to get his co-operation in financing this scheme." He did, and in the year 1900 was launched the Macdonald-Robertson seed competition, under the supervision of the present Seed Commissioner, Mr. G. H. Clark. In three years, the results in wheat and oats were so satisfactory, showing an average increase in the yield of wheat of ten bushels per acre and of oats of twenty bushels per acre, that is was thought that it would be little short of a calamity to let the work stop there. The Canadian Seed Growers' Association was organized and a large number of the parents whose children competed in the competitions were among its first members. This was during the season of 1903-4. After ten years of experience in seed selection, the members should throw some light on the nature of the work of their association.

Object of the Association. Perhaps its main object is to encourage the production of high class farm seeds, which will not only increase the yield per acre of such crops, but will also furnish seeds of the highest quality. As is the case with most movements for the advancement of the economic conditions of farm life, this idea of seed selection and improvement has been comparatively slow to take root. From the inception of the co-operative experiments in agriculture through our Experimental Union in 1885, when, fresh from College as an associate, I had the honor to be one of the first experimenters, and also, I am free to confess one of the first to blunder; but one can learn even from his mistakes. I was not then impressed with the real value of the work nor the service it has since been to me. I somehow feel that many members of the C.S.G.A. do not realize the importance of the work in which they are engaged. Through the line upon line and precept upon precept policy laid down by our wizard of plant growth and improvement, Prof. Zavitz, and his band of faithful workers, along with others engaged in similar work throughout Canada, the scales are beginning to fall from the farmers' eyes, and they begin to see that there is money in the job.

A not unimportant factor in getting the farmers to see these results has been the field crop competitions, under the efficient direction of J. Lockie Wilson, the superintendent of the Fairs' Association. Seed fairs, too, have been doing their part in this direction. The administration of the Seed Control Act through the Seed Branch has contributed to the same end. The Farmers' Institute system too has preached the gospel of good pure seed so long and so well that now it can be said that the propaganda for the production of good seed has passed the experimental stage. It has really got hold of the farmer. It is even touching Prof. James' "indifferent farmer."

The Method. The methods are those outlined by the executive of the association in the C.S.G.A. annuals and are reasonably easy to practice. In the improvement of wheat, oats, barley and kindred crops, the beginner has the choice of two methods. (1) He may make his selection from the mother crop, in which case it will take three years before he can produce registered seed; or (2) he can buy registered seed from one of the members in good standing which enables him

to gain two years in the production of registered seed. He is required to select from his breeding plot (so called because it corresponds to the use of a purebred sire in the improvement of stock) enough of the best heads to sow, when threshed, at least a quarter of an acre; in case he selects twice as much, he will do well to hold half of it, in case of some unforeseen calamity to his plot. This is particularly true when he is producing registered seed. He may if he chooses have as large a breeding plot as one acre. His hand-selected plants sow his breeding plot. When he is producing registered seed, the seed in the straw registers as *hand-selected plants.* All the rest of the seed produced on the breeding plot is registered as *improved seed.* The improved seed may be sown on what is called an improved seed plot and the product of this plot will register as general crop seed. The registration is limited to these plots and improvement is made or held comparatively stationary by selection from year to year from the breeding plot. The art of breeding may be epitomized in the word "selection," for seeds as well as stock.

The methods for corn and potatoes are somewhat different, as the corn plot is 20 hills one way and at least 50 hills the other; while the potato plot consists of eight hills from each of the 25 hills which have been kept separately for the purpose from the previous crop, making 200 hills in all.

These plots of members are visited once each year and reported upon by competent persons, who are expected to offer suggestions and encouragement to the applicants and members. Anyone may become an applicant without paying any fees on condition that he will endeavour to follow the directions of the association in improving his crop or crops.

Advantages of a Breeding Plot. On a small plot of ground the operator is able to control most of the factors for producing seed of the best quality. For instance, he can treat the seed for smut, reducing the danger to a minimum, he can prevent weed seed contamination, he can eliminate all plants not true to kind or variety, and he can let the seed get well matured before harvesting. All this can be better done if, when sowing his plot, he closes a drill hoe now and then. The spaces may be used to prevent too much tramping down of the grain.

Results. As before intimated, the work of the association may now be judged by its results. Those who are reaping financial rewards are those who have paid closest attention to details and who are delivering the goods to suit the users of such seed.

Every December those who attend the Winter Fair at Guelph, Ont., Amherst, N.S., or later at Brandon, Man., have an opportunity to inspect the finished products of a number of the members. This year the display was the largest and finest the members ever put up. Many of them have a considerable quantity of this improved seed each year which is not advertised in the annual catalogue of the G. S. G. A., as their neighbors gladly pay 25c. and more per bushel over commercial prices for such seed, and they cannot supply the demand. Among such members may be found C. R. Gies. Heidelburg, with his Dawson's Golden Chaff; William Lewis, Dunsford, with Siberian oats; Chas. Pearce, Wellington, with his sweet corn, in Ontario; Donald Innes, Tobique, oats and wheat, in New Brunswick; Thomas Waugh, Bedeque, P.E.I., with his Banner oats; and others in Nova Scotia and the Western Provinces. Of the operating members sending in satisfactory reports a year ago, 63 are working with wheat, 61 with oats, 21 with barley, 22 with corn, 4 with peas and 21 with potatoes. It will be seen that some farm crops have not as yet been touched by the members, and that there is plenty of room to work with the crops already taken up.

Now that the regulations have been modified so that selection of heads need not necessarily be done in the field, but may be made from the sheaf in the shock or mow, and that the seed from our experimental stations (which may be obtained through the Secretary-Treasurer of the association) is to receive some standing, others should be encouraged to take up this work. They will have results in better farm crops and in an enlarged market at satisfactory prices. The work is bound to progress. Fall in line!

FOR THE BEST RESULTS, SHOULD THE TENDENCY IN ONTARIO BE TO GROUP FARMS INTO LARGER ONES, TO DIVIDE THEM INTO SMALLER ONES, OR TO LEAVE THEM AT ABOUT THEIR PRESENT SIZE?

A. G. MacKenzie, Fairview, Perth Co.

Before answering this question, may we be permitted to ask other questions. What are the best results? What is our goal? Do we simply aim at the greatest amount of farm produce to be placed on the markets? Do we aim at securing for the farmer the most favorable balance sheet? Do we wish to permanently increase the farm capital of the Province? Or do we wish to build a better type of life in the home and in the nation, more comfort and happiness in the home, a longer life of usefulness for the average individual in farm life, a more patriotic and cosmopolitan type of national life?

We should first consider that farming is a business suitable for family life, the business most suitable for home life, a calling not suitable for the individual to pursue by himself alone. The family and home are the essential units of national life. On the farm we have the primary essential conditions for the unit of national life, but it is in the rough, as we in Ontario see and know. The ore in the mine presents a valuable product in the rough, but suggests the possibility of being worked into refined products of mechanical and artistic design. So may we not aim to produce from the rough conditions of farm life as now known in Ontario, a standard somewhat in keeping with other improved standards in useful material activity.

The size of farm in Ontario is varied from ten acres to ten hundred acres, but the most generally recognized standard in ordinary farming is one hundred acres, and for present day purposes there appears to be no strong reason for a change from this size of farm. A farmer who attends to his business can have a comfortable home for himself and family, can give his children a fair education, and a modest start in life from a farm of 100 acres, but it requires health, a close application to work, and an intelligent understanding of business. Taking an average of many situations in farm life, we think the man with a family on 100 acres the most desirable. He teaches his children to work, sends them to school, and gives them a chance to earn a little money. Then, as they finish schooling, he may buy more land with the idea of giving some of them a start in farm homes of their own. A young man in this way getting a start on 100 acres with a debt to half the value of his property, has a good start. A young man getting 50 acres with a debt to half the value of his property has clearly not so good a start as the former, but a young man starting on 50 acres with a light debt may be in a better

position for a time than the man on 100 acres with a heavy debt. The man who has help in his own family, or who can obtain good hired help, is in a better position on the 100 acre farm than on the 50 acre farm, but if he cannot secure good help he may be as well or better on the small farm, better for national productiveness, for a favorable balance-sheet, for capital improvement, and for an intelligent and comfortable life. To have a small farm that is good is ahead of a large farm that is poor. The average individual will do well to begin with small things that are good and avoid larger things that are poor, but aim at larger things that are good. A good 100 acre farm gives more to go and come on than a good 50 acre farm.

In the decline of life, a man's family may leave him and go on farms for themselves. In this case he may do well to go back on a small farm rather than retire to a town or village. We have in mind a few farmers who finished their days on small farms, and who were better farmers than ever they were in their younger days on larger farms.

S. A. Northcott, Taunton, Ontario Co.

The time has come when the Ontario farmer, in order to make the most of his profession, needs to arrange his crop and his work so as to keep the necessary help he needs profitably employed the year round, and in order to get things done when they should be done, he needs up-to-date and wider machines. To work this out to advantage, he does not want too small a farm. I would group the small farms into farms of 150 to 200 acres, tear out all but about two of the cross fences, make three large fields of the farm and run a three year rotation, and go to work with four or five horses hitched to a wide plow, seeder, cultivator, or harrow, to match the horses, and the work will be done up quickly and properly at the right time and far easier than the ordinary practice which is conducted on a small farm of less than 100 acres, where one man plods away after two horses and small implements; while the other fellow, with two or three extra horses, does more than twice the work, and at harvest time has twice the revenue for his time spent. The capital invested in necessary machinery and horses for a small farm and that for a large farm does not increase with the same ratio as the size of the farm. Two hundred acres can be worked to advantage, but that is about enough to work with one set of the necessary implements, horses, etc. Some farms of 150 or 200 acres do not produce enough to suit the farmers who work them, but they could probably be made to produce a great deal more if handled right and the proper kinds and varieties of crops were grown. Make the farm produce more by some means. The capital invested, taxes, ordinary running expenses, cost of living, etc., is the same on the farm when it produces a poor crop as when it produces a good crop. Better drain those portions of the farm which require it, and get bumper crops where scarcely anything now grows; get alfalfa started and produce more hay of the best quality; get the crops in early in the spring, as soon as the land is fit, but do not try to cultivate it with two horses and an old narrow cultivator and seeder, for the weather will not be favorable in many cases to give you time to handle it with these implements.

Sow only the best seed obtainable and the varieties most suitable to the soil and conditions, have a silo filled with good corn, make the hens lay when the prices of eggs are highest, have things ready for the market and sell when the market is good and not when the market is glutted. Good prices are sure to come for

good stuff. Look after the Ontario farm, the opportunity is here as well as in the West.

W. J. Lennox, Newton Robinson, Simcoe Co.

I think that there are more farms of one hundred acres each than of any other size. My experience has been that a hundred acre farm is not as easily worked as a 50 acre farm or a 150 acre farm. A man needs and can afford to pay for help on a 150 acre farm, and on the 50 acre farm the experience seems to have been with the farmers of my section that they can secure help for a short time in the summer when they need it.

I have jotted down a few suggestions in favor of the smaller farms, although before saying anything in favor of the smaller farms, I would say that I would rather, in the first place, be in favor of dividing the farms into larger sections, dividing the fields so that they would be of larger acreages and with fewer fences. We have heard to-day a lot with respect to the noxious weed seeds that are being spread through the Province of Ontario by the weeds being harbored along the fences and in waste places. Whose fault is it? It seems rather difficult for a man to believe that weeds would grow to a height of 5 or 6 feet, but, unfortunately, I have had the privilege of cutting sow thistles with a binder that were five feet high on land low and very rich. The sow thistle had spread to such an enormous extent that it was hardly possible to grow a decent crop without the aid of a summer fallow or some other means of eradicating this noxious weed. Then in these large fields you may use the large implements and 3 or 4 horses could be driven by one man, thus lessening the cost of labor. When you have the buildings all in the one place you have less waste of land in lawns and building grounds. This seems to be rather a small point, but when you consider farming from a practical standpoint it seems that it is the little details upon a farm which are going to make up the profits or the losses. There is generally a less amount of waste land on a large as compared with a small farm, which would be an advantage. There is more labor on the large farm, and you can distribute your men into special places on the farm, and they would thus become more interested in their work and would give better satisfaction. It would cost less to build large buildings and outhouses on a good sized farm than to erect smaller buildings on each of two or three smaller farms. Another important point would be that you could have one manager over a greater amount of land and thus greatly economize the outlay.

Let us now consider the smaller farm. On the small farm you necessarily have small fields. But you can have portable fences which can be removed and thus permit of the noxious weeds being eradicated. The man on the small farm has more time to devote to the eradication of these weeds by whatever means he chooses, such as rotation, summer fallow, etc. While we do not have as much labor, we can generally secure labor which is more competent. The farmer himself will do the greater part of the work. He will secure possibly the services of one good man on whom he can depend. It is not the quantity of labor that he wants so much as it is the quality of the labor. He can depend on his hired help for anything he asks, and he can superintend the labor himself.

Usually the quantity of stock is not as large on a small as on a large farm. Consequently, the farm stock will be more closely looked after, and we know from experience that it is only by close attention to the animals on our farm that we are going to secure the best results. On the small farm a man goes more into

details and becomes deeply interested and pays more attention to agriculture in general.

When you have a large farm and one set of buildings, there is a great deal of time lost in going from one portion of the farm to another. Whereas, on the small farm your work is always at hand. When everything is close, it is very much easier to look after the various farm operations in the proper way and at the right time. If we would look into the experiences of farmers on different sized farms I believe we would be fully convinced that the increase in the average crop is quite marked upon the small farm in comparison with that upon the larger farm.

The decrease of the noxious weed seeds, the value of the more competent labor, the faithful management, the larger average crop secured—all these, together with the greater interest which would be taken in the small farm by the farmer, would be sufficient reasons, I believe, to hasten the tendency to divide the farms into smaller ones, rather than to leave them as they are, or to group them together into large ones.

PROF. C. A. ZAVITZ, GUELPH.

Perhaps some of you will remember when Prof. Spillman, of Washington, was here about six or seven years ago, and in an address in another hall he told about a man by the name of Dietrich near Philadelphia who farmed a 13 acre farm. He told us of the wonderful results he obtained, and how, after a few years, he had over 30 head of stock, cattle and horses. Since then a company had been formed and it was arranged for Mr. Dietrich to endeavor to carry out the same principle on a farm of 300 acres as he had on the 13-acre farm. When I was at Washington more recently I asked Mr. Spillman how this system was working out on the larger farm, and I was informed that Mr. Dietrich was not having as good success on the 300 acres as he had had on the 13-acre farm, owing principally to two reasons. On the 13-acre farm he had one man and one boy to do the work He knew what they were doing every hour of the day. He had the work wonderfully systematized, and everything was very orderly. When he came to carry out the same idea on the 300-acre farm he found it was impossible to get the same quality of help and to have the same perfect system and interest in the work when so many more men were working together. The other reason was the greatly increased cost in hauling all the feed, manure, etc., at much greater distances. On the small farm there was the greatest economy of both time and labor.

I have gone through Belgium where the average farms throughout the country are about 8½ acres in size. In Jersey Island, I think the average farm is about 7½ acres. In parts of Japan, it is about 3 acres or perhaps a little less. There is where we get intensive cultivation. I believe we will not have those conditions in this country for a long time. They come with a denser population. Of course, circumstances alter cases a good deal, but I think in most cases we get better results by carrying on more intensive farming. With the larger farms it is often very difficult to get suitable help which is interested in the work, and we often see some of the larger farms very poorly worked, owing largely to the lack of help of the right kind. I know there are good reasons which can be advanced in favor of both large and small farms, and it was with the object of bringing out some of these reasons or arguments that this subject was entered on the programme for discussion at this time.

HELPFUL SUGGESTIONS IN FARM PRACTICE.

G. B. McCalla, St. Catharines.

The various educational forces along agricultural lines have for years been instructing the farmers of this Province in the art of making two blades of grass grow where but one grew before. That is a great and good work, but to my mind the time has come when more attention than in the past should be given to the business side of our profession; for what profit is there in performing that miracle if there is no money in it. No matter how much any man may love farming for its own sake, his feelings will be still stronger if he is getting an adequate financial return from his labors.

Prof. James, some time ago, gave an address on "The Problem of the Indifferent Farmer" in which he advocated the usual means of increasing crop production. If a few of the indifferent farmers doubled their production it would undoubtedly benefit them, but if all did so they would be where they were before, financially; for as far as my experience and observation goes, there is as much money made when crops are generally short as when universally bountiful.

That farmers are not indifferent or satisfied with existing conditions was strikingly shown by the large and representative delegation that recently waited on the Dominion Government. That dissatisfaction is not confined to the rural population is shown by the universal complaint from the cities of the high cost of living. I have no ready-made remedy to offer, and it would be worthless if I had, for the economic and social life of any people is changed, not by revolution or act of parliament, but by the gradual education of the whole nation to see the defects of its present system, and so be ready to accept something better. All I will try to do here is to point out a few of the leaks in our present system.

It is a truism that all wealth comes from the earth—that is, the farm, forest, sea and mine. It has also been stated, on good authority, that "if a man will not work neither shall he eat," and this has been generally considered to imply work to produce wealth directly or indirectly from one of these sources and not merely working your fellow men.

There is far too wide a margin between the cost to the ultimate consumer and the price received by the producer. There is far too large an army employed in distributing the products of labor, and they demand far too large a share of those products for themselves. The *Rural New Yorker* has been carrying on quite extensive investigations along this line, and has found that on an average the producer of agricultural products receives about forty per cent. of the price the consumer is compelled to pay, and in many cases very much less. A similar army of middlemen increase the price of goods the farmer has to buy, and when to this is added the extra tribute the protected manufacturers are able, by the tariff, to exact, it is not to be wondered at that conditions are so unsatisfactory as to be depopulating rural Ontario. In this connection might be mentioned the hundreds of millions of dollars annually expended for advertising on this continent and which are largely lost so far as the community as a whole is concerned.

Co-operation, where carried on, is alleviating these conditions to some extent, but much remains to be done. Whatever means of redress are used there must be united action, for that section of the people who stand to gain by a continuation of these conditions will not give up their privileges without a struggle.

Over-capitalization of the great industrial and transportation companies is another great drawback to general prosperity. It is by this means, aided by an un-

just tariff, that a few men have been able to get control of wealth beyond the imagination of even a quarter of a century ago, and to which they have no moral right. This condition is particularly seen in the United States, but has already developed and will continue to prevail in this country unless steps are taken to control it.

It may be claimed that all this is foreign to the subject stated. I hold, however, that anything which will promote the general good of the farming community is worthy of consideration by this meeting, and it is along the lines I have indicated as well as by increasing crop production that we must look for prosperity for ourselves and for the nation.

MR. JOHN CAMPBELL: I am a farmer on a small scale. We hear a very great deal about the feats of men, of the man who makes two blades of grass to grow where but one grew before. I think the problem concerning us to-day is more in connection with the disposal of the grass after we get it. We notice the effort of the labor unions to make an eight-hour day, and my views are that the farmers would do better to follow suit and allow the prices to be doubled and that would effect the same object. Now, the whole subject is extremely difficult. We hear people complaining so much about the high cost of living, with eggs 40 and 45 cents a dozen, butter 30 to 35 cents a pound, and we have to pay 60 cents for potatoes, while the farmer is only receiving 35 cents for his potatoes. The remedy for this state of affairs, when you come to the bottom of the whole thing, is to educate the farmers. Not very long ago the cement people combined together, and the price of cement went up. Some grocers combined for two or three years and asked for a similar increase in the price of their goods. When there is a scarcity of eggs, up goes the price. There is sometimes three or four hundred per cent. between what the farmer gets and what is paid for farm produce. I think that the whole subject devolves itself largely to educating the farmer along business methods, increasing the intelligence of the farmer so that he knows where to buy and sell. Take as an example, nursery stock, the cost of producing nursery stock is a mere trifle; the whole expense is in the selling of it. It is education that is needed along the line.

PROF. ZAVITZ: I see Mr. John Elder, of Huron County. Will he kindly tell us what the O. A. C. No. 21 barley has done for him and his neighborhood?

JOHN ELDER: In the year 1906 I applied for O. A. C. No. 21 barley. That was the first distribution of this variety from the department at the College. That year I think it was 31 pounds that I obtained from the one pound sown. In the following year I had 25 bushels and 5 pounds of clean barley when I came to sow. I sowed that on 18¼ acres and on that 18¼ acres I got 900 bushels. That was increasing one pound to 900 busels in three crops. The next year I had about 700 bushels. I have disposed of all of my seed for a dollar a bushel and have not been able to supply the demand. This year I had about 1,000 bushels of the O. A. C. No. 21 barley, and I expect to get a dollar a bushel for it again.

Q.—Did you ever have any trouble with smut in the barley?

MR. ELDER: Not to any extent. In my experience, so far there has been very little smut.

Q.—Has the formalin treatment with the smut any effect?

PROF. ZAVITZ: We have been very successful in the use of formalin in killing the stinking smut in wheat and the loose smut in oats, but not so successful in killing the loose smut in barley. The hot water treatment is the one recommended for the treatment of the loose smut in barley.

PROF. MCCREADY: I have one suggestion which I think is of some practical importance to the farmers of the country. In going about the country, being par-

ticularly interested in the country school problem, it seems to me there is some need for education along the line of care of property, and of general tidiness about places, to have the children and teachers co-operate in tidying up the school property and in keeping the fences in better shape. I am told that in the Old Country, on some of the big farms, a certain number of hours are given every Saturday afternoon to a general tidying up. Farm work is knocked off, and the employees on the farm are given that time to put away the harness and clean the tools and put them away. And I suppose it may extend to doing something around the house and in tidying up there. And I think the farmers in this country should take a few hours on Saturday afternoons for improving the appearance of the farm home, by fixing the fences around the buildings; taking out the rags that may be stuffing up some of the windows; doing a little painting now and again; gathering up the loose tools lying about the place; mending the harness; picking up the loose boards along the lane; swinging the gate rightly if it is creaking; or if it requires a loose board to fasten it up. To one going around the country looking on the outside of things, there is a great need of an improvement in tidiness.

THE COUNTY REPRESENTATIVES AS HELPERS IN BRINGING ABOUT A BETTER AGRICULTURE.

Dr. G. C. Creelman, President O. A. C., Guelph.

For fear that the whole question of agricultural representatives in country places is not being clearly understood either by members of our student body present at this time, or the members of the Experimental Union, I am going to take the liberty of going back, even taking the chance of tiring you, to tell you something about their origin, or the organization work in connection with these agricultural representatives in our different counties. It is such an important work, and the outlook looks to me to be so hopeful, that I am going to try, as far as I can, to persuade every one of you of this one fact, that this seems to have been, in this Province at least, the best method which we have been able to adopt in recent years for the carrying of the gospel of agriculture to every creature in country places.

We have been at the College, and the Hon. Mr. Fisher has been in his sphere of work at the experimental farms, collecting data during all these years in regard to certain things, certain methods, and certain crops, that he and we might give to the people, through our experiments, doing for the people what the people could not do for themselves, results that would enable them to go on and do better work on their own places. But there seems to have been a missing link between the actual securing of the information and putting it into practice not only by the better farmers, but especially by the indifferent farmers. Indirectly, we know they have been benefited by the work of our Agricultural College and experimental staff. And so we have been trying during recent years in this Province to make some arrangement to get a little closer to the men on the farm with the information. This work commenced three years ago last June. At the end of nine months, after the first six men had been appointed, I was asked by the Education Department to look over the ground and make a report on the work these six men had been doing. This report was published, and is available to any person who wishes to give it a more careful study. Now, that report going into the detail of the work, will give you some idea of the beginning. In a word, these six young

men were turned loose in six different counties practically without instructions, except that they should do for the farmers on their own farms those things which the farmers up to that time had not been able to do for themselves. These six young men went at it, the next year two more were added, the next year three, and the next year four, and now we have fifteen young men each in a county, each taking up some special work in connection with agriculture, and each working up some agricultural scheme for that county without very much direction or oversight. The work is making progress, and the government is becoming convinced of its value, and recommends more appointments each year, and I am in hopes that it may not be very long before this work may be carried on throughout the length and breadth of the Province.

Now, I want to mention some problems for these men to solve, and how to go about it to solve them. In the first place, I believe that the greatest need at the present time in the agricultural parts of this Province of Ontario is a change in the social life of the people. We have an intelligent people; we have an industrious people; we have a moral people. Our boys go anywhere throughout the world, and and do well, especially in the United States. Our girls are going there also as nurses or teachers. There is a demand for them. The girl and the boy, as a rule, are not there long before they are at the front. Young men graduates of this College are in 38 different College and Experiment Stations, such as this institution, and they usually are at the top, the chief professors. And wherever you may go, with this institution, with the universities, wherever our young men have come from the farms of the Province of Ontario and devoted themselves to one thing in life, that training that they got from their parents, and the morals they possess, and intelligence that they inherited, have made our young men a success wherever they have gone. Now, it was when they changed their social conditions that these things happened, and in my opinion a large part of the success is because they have changed their environments and have come to bigger things. What I mean to say is this, that the curse of the city to-day is the congestion of the city; and, on the other hand, the curse of the country is the isolation thereof.

Now, there are two factors which may do a great deal, I believe, to the elimination of some of these social difficulties in the country. The first, of course, I must place education, because we have been trying to educate our farmers to get a better sense of the needs of the farm, by experiments, at our Agricultural College and Experimental Farm. Because of these things, some persons have come to think that some things have perhaps been overdone, that the farmers are being entirely over-educated. An article by a writer came out in the illustrated section of one of our weekly papers lately in which he said that the work of the agricultural department in Ontario was the work of the child—it accomplished nothing whatever during all these years. Now, you see what an extreme view that is. Yet he will be believed to some extent, by those who do not know. They must feel at the same time that education at the present time is somewhat of a problem. All would be quite justified if their statements were true. But we must not say that our whole school system is wrong, and that all the schools are no good, simply because Ontario is not going as far ahead as we think it should go.

Of the two that I am going to mention, the first means for bringing about a better social condition in country places is the need of better and I may say a different kind of books. Now, in the consideration of our schools, we have not to forget the good moral influence on the boys who go there. Some fellows do not want you to bother with too many books. Teach him all you know in a practical way. The idea some people have of education is that it is nothing but simply

books, books, books. I would agree with them if by books they meant too many books. I know education must not be all books alone. We do not want either, too many subjects. We hold about 800 Farmers' Institute meetings during the year, and wherever we could get people together to listen to us talk, we have talked. We have served to supply the revival, rather than to bring to the farmer any special or specific information which he could immediately go out and apply on his own farm. I would like to see our farmers educated, not by bulletins, not by experiments, not by debating, not by Fall Fairs, not by all these things alone. We have had all these things placed before our farmers and yet little advancement has been made in many sections along the line of bettering their condition.

What, then, would I suggest I would suggest two things as a remedy, in addition to what I have stated already, which I believe we have got to pay close attention to. First, teaching by demonstration to the leaders. The man from Missouri says "Show me," and there never was a time when the farmers themselves, Mr. Putnam says, want so much to be shown how. They say, "Can't you show us something that is better than we have got?" And we are introducing live stock and seed judging to take the place very largely of the Farmers' Institute work, as we can get the money and the men and the time to do this work.

Now, then, where these agricultural representatives have taken and placed before the people an orchard which had run down and actually taken the particular orchard and put upon it the very best treatment that they can give it that year, and carefully watched the orchard the entire season, and have been able to exhibit that crop side by side with the farmers' crop at the Fall Fair, they have done more to bring about questions and bring about enthusiasm for improvement of the orchards than they would have done by talking and writing bulletins day after day. But in all these things that we have been doing we do not want to be too radical. Get men enthusiastic over the work. When that work is left in the minds of those people, they go home and read the bulletins all the way through and get all the good out of them possible. Some representatives have no place for live stock, and yet we find that after every live stock demonstration we get hundreds of post cards for bulletins. Some farmers have not been thinking systematically; but when they have attended and seen the animals brought in and placed in order of merit, and have heard this man or the other man explain all about each animal, show up its good points, and the advantages to be derived from feeding such animals, the farmer says "I would like to read something further about that, because I have seen the demonstration and know what it means." It is, I believe, the personal touch, the actual demonstration that is going to count.

The second object should be to teach children in schools, and young people in clubs. That is what many representatives are doing, getting clubs going. They have a regular meeting every two weeks. Get the young men of practically the same age together every two weeks all the winter long, and not by formal debate, but by open discussions, take up some subject which the agricultural representative thinks ought to be understood, or some crops which he thinks should be introduced in his county. And then the men adopt those new ideas which are thus carried to them. That, probably, has been our greatest drawback all these years, that when we have taken the subject up in all its branches, compared it from all sides, and explained everything that goes to make up the success of a crop from the time it is sown to the time that it is harvested, the most discouraging thing was that we were not getting right down to the farmer and getting him to adopt our methods. The hardest thing is to get these facts as they are studied, to get these men who are growing the things to realize which is the best uniform seed,

and which would give the big yield, and so on. We did not seem to be able to reach them. But now, through these farmers' clubs, which meet regularly and often, I am convinced that more is going to be accomplished. At these meetings all of the time is not taken up by the speakers, but the subject is introduced in a short address, right to the point, and then all are benefited with the opinion which is very valuable of every man there who has been trying something or another along the same lines.

This, I say, will come by teaching and demonstration. But there is a second point, by teaching children in schools. What a great subject it is. Twice have we tried to introduce text books into the schools, and twice we have failed. It fell through because the teacher herself was not prepared to go on with the work. We are remedying that by having actual teachers come here and study agriculture. Not much can be accomplished in ten weeks, yet they are able to get some suggestions, some help, and go away with an appreciation of the work of agriculture and the necessity of a more particular and exact knowledge being spread, and ready to give these facts and start in a small way the teaching of agriculture in our rural schools.

The first suggestion, then, I have to offer for the improvement of social life in country places is, education of the new kind; second, the preparation of the ground for co-operation. Really that means the moulding of public opinion along the lines of the farmers getting closer together for their mutual benefit. I believe that co-operation will destroy isolation. To destroy this isolation I have noted just four things: First, improved wagon roads; second, rural mail delivery; third, farm telephones; fourth, trolley lines. These things cannot be brought about without co-operation, and yet by the breaking down of local jealousies, the suspicions of farmers one of the other, and introducing these four things, I am quite sure the isolation will be broken up. The destroying of these petty jealousies, which lead to lawlessness and vice, and fights among neighbors, and are brought about entirely by isolation, is what is desired. When the sons and daughters of these people go into the cities you do not find them fighting about the line fences, and such like. But in the country these people carry it into their politics, into their churches, into everything, simply because of the time they have at their disposal to brood over these things. The curse of the country is the isolation thereof. But they are getting out into better social life through the agencies I have mentioned. I am sure they will break down the local petty jealousies. And all this time where agricultural representatives are working I see these things being accomplished. I am corresponding with the men, and I find all this going on through the agricultural representative, who is now the man on the job. He has the confidence of the people in the community or locality, and he is there as their representative in a non-political and non-sectarian way, to help them out along the lines that I have mentioned.

The farmer, in my mind, is the most substantial, and, therefore, the strongest individual in Ontario to-day, and the poorest as a class man, because he doesn't co-operate. I am in hopes that we will break down his pride of strength, which is too often manly strength, and develop what ought to be the prevailing spirit, the spirit of co-operation. I am in hopes for a bigger and better rural condition of things than we have at the present time.

ADDRESS.

Prof. C. C. James, Deputy Minister of Agriculture for Ontario.

A short time ago I had the opportunity of addressing another audience on the subject of the problem of the indifferent farmer, and it has been discussed more or less in the Press and otherwise ever since. Well, now, you are not the indifferent farmers. If you were you wouldn't be here to-day. I take it that your very presence here, at the Agricultural College, either for the long course or short course, or merely for this three-days' course, is convincing evidence that you are not careless, indifferent farmers, but rather the contrary, that you are wide-awake, enterprising, student farmers, anxious to study the business in which you are engaged, and anxious to fit yourselves for the calling to which you have attached yourselves. That being the case, you must be readers and thinkers, and so there must be pressing upon you, even upon the youngest of you, a large number of questions in connection with agricultural work at the present time.

The day has come, then, when the agricultural community, agricultural work, and agricultural methods are beginning to form a large portion of the consideration of the public affairs of this country. In the City of Toronto we have a Canadian Club, and during the past six weeks we have had no less than two addresses on this question of the relationship of the farmer to the most important public question of the day. Coming up on the evening train, I opened a paper, and I began to read the subject that was taking up the largest space or portion of that paper, and it was the report which was read to-day by the President of one of our largest Canadian banks. Now, I advise you all to read that. You will say, "Well, what has that got to do with us farmers?" Well, if you will read that you will see why I have advised you to read it. From one-third to one-half of that address deals with the agricultural situation in Canada as a whole, and of the different provinces. The agricultural question is not confined in its interests to you who are directly engaged in it. The financial men of this country are interested in it. The railway men of this country are interested in it. Our people in town and city business are interested in your calling, and it is for you, then, as students of agriculture, to take the deepest interest in your work and to become as well informed as you can about it.

If you are students of a new agriculture, you will ask, what are the problems which we have got to face? There are just two or three of these things that I want to refer to to-night. If a man is going into a business like agriculture, he ought to put himself in the same relationship to it as is done by a city man who starts out to manufacture goods. You are manufacturers. You have a market. You have customers or purchasers for your goods. Now, the manufacturer who would start out to manufacture goods for which he had no market, for which he didn't know whether he would find a market or not, about which he had doubts, would be set down at once as an unscientific man and one who would be fit for confinement in a lunatic asylum. The first thing, then, a farmer ought to study is, what are the demands of the country, what are the markets asking for, that you, as farmers, produce. Then, if you do not produce articles that the market is asking for, you must expect to fail or have a very uncertain business career. We find that, so far as the Province of Ontario is concerned, there are a few things most in demand. There was a day when wheat was the great article to be produced in this country, because there was an unlimited market for it, and the prices were good. But that day has gone by, and the farmer will produce wheat to-day mainly to feed it or as part of his necessary rotation. But not as the most important article of

his year's work. There was a day when barley stepped in, and it commanded the first place in the farms of Ontario. That day has gone by. But if we look over Ontario to-day quite a few things stand out prominently to be in demand. We are supplying grain less and less, but there are things the demand for which is increasing, and the price of which are increasing correspondingly. Take, for instance, along the line of high-class stock. You know what has happened in the last two or three years in regard to Ontario. The demands of the West have grown and grown, till you go into certain sections of the Province of Ontario to-day you will find a dearth of first-class horses, a dearth also of second-class horses. You begin to make enquiries, and you find out that they have been shipped to the West. And large numbers have gone into Northern Ontario.

Now, as students of agriculture, as men who are engaged in this work, and who are also studying the question of supply and demand, it seems to me that we ought to get down to a consideration of what the breeders, under the circumstances, should do in connection with the horse industry. With the recent depletion, what are we going to do about the breeding of horses for this market. The demand is going to continue, and perhaps increase during the next few years.

Take other lines. Take the question of poultry to-day. Go back some seven or eight years ago, and what was then the result? Canada had a very large surplus of eggs to send out of the country. I think we had a surplus of eleven million eggs. We had enough eggs for our own market, and eleven or twelve millions surplus to send to other markets. And now the extraordinary situation is before us, that the Dominion of Canada, one could hardly believe it, is not able to supply herself with eggs for her own consumption. What has been the result? There was only one result possible. Just as the surplus diminished, the price goes up. There is a question which you, as producers upon the farm, ought to give careful and close study to. It is not a question simply of getting the trade returns, and looking over them and seeing that so many years ago we produced so many eggs more than we required, and comparing that with the situation now. That is not the question at all. It is only the beginning of the question, only the introduction to it. If you are going to make a study of your business, you have got to carry it a dozen steps further, and begin to study out this question as to whether in connection with your work you cannot do something to meet this demand and get some of the returns that will come from the meeting of that demand.

Then, take the question of fruit. When we look at the enormous acreage of fruit that we have in the Province of Ontario one wonders at the dearth of first-class fruit. One wonders when you look over the millions of apple trees, pear trees, cherry trees, and peach trees, one wonders why it is that the whole of Canada from one end to the other is not overflowing with fruit in the fruit season. What is there in that situation which you, as students, ought to look into? If you begin to inquire into it very carefully you will find something like this, that while there is this extra abundance of fruit trees, this large acreage of orchards, yet the amount of first-class fruit that is produced is very, very limited, that is, the amount of first-class fruit which is produced in all of Canada is unequal to the demand for first-class fruit. We have an unlimited amount of the second-class stuff, but of the No. 1, of the first-class, there is a very serious shortage. What is the conclusion? There is only one conclusion, and that is this: that if anyone is going to enter the fruit business his aim should be to meet that demand for the first-class, and let others, the indifferent chaps, let them supply the seconds, thirds, and the culls. Now, there is a problem in connection with fruit-growing that is worthy of very

careful consideration. And if you should come here to this College and get instruction in horticultural work, and do not get down to the careful study of the question from this standpoint and go away without some further information and some further stimulant along these lines, the time given in study will have been misspent.

Then take the question of dairying. I doubt if there is in the Province of Ontario to-day any more important production for study than that of butter and cheese. I suppose the majority of the people in towns and cities think that the production and marketing of cheese is a very simple affair. There are some problems in connection with the great dairy industry of this province which, to my mind, are worthy of more than incidental consideration. I can take you to a county in Ontario to-day where they have as fine a lot of cheese factories as are to be found in any county in Ontario. Where they have the most expert instruction. Where the cheese has been marketed in such a way as to bring the top market price. And in that same county during the past year the farmers have averaged little, if anything, over 85 cents a hundred pounds for their milk. Here is a man engaged in the city in the manufacture, we will say, of ploughs. I will use that as an illustration. Now, there is a steady market for ploughs. He knows before he begins his work almost to a cent how much he can sell those ploughs for. There is a certain staple fixed market, and he is going to get within a few cents of that market price. Before he begins to put up his factory, even, he can figure out how much each is going to cost him; figure out what his plant is going to cost, how much he will have to pay his workmen day by day—that is a comparatively simple process; that is, when put alongside of the question of producing and marketing such an article as cheese. Some of you here are dairy students. Just go back through that whole process and see how complicated it is. First of all, there is the production of the feed. Now, as students of agriculture, you, and others who are not so equipped, should be able to sit down and study out at least somewhat the cost of production of the raw material that you start with. Well, there is something that is just about as difficult to do as to make the whole calculation referred to in the production of ploughs. Then you get the next question of the feeding of the food to the animals, and you have got something there that will call out the best that is in you, to determine what it costs you to feed your animals. And then you have got to come up into the factory and make a study of the question of the handling of the milk and of its manufacture into the finished article. And then when you come to the question of marketing, you have come into one that is far and away more difficult than the average article that is produced in towns and cities. What I am trying to get at is this, that the question of the production of a pound of butter or a pound of cheese and of so getting for that what is really due to you is a far more complicated question than that which concerns the manufacturer of ploughs. Don't dismiss these questions with the idea that they are very simple, easily comprehended, easily worked out. It makes no difference whether it is the production of a pound of beef, a dozen eggs, or 100 lbs. of milk, all these processes, starting from the first up to the last, are so intricate and so complicated that it will take the very best material that you have got inside of your head to work them out along the right lines. This agriculture may at one time in this Province have been a comparatively simple thing. The day may have been when men could go out and without any special instruction or any special scientific training or any special observation, simply sow the seed, get the harvest and sell the grain, and so on. There may have been a day when things worked liked that. But that day has long gone by, and the farmer of Ontario to-day who

is going to face his work, and who is going to carry on his work with a fair prospect of success has got to understand that the processes that present themselves to him, that the work that confronts him, that the problems that he has to solve, are no mean and simple problems, but problems of great intricacy, but demand that arrangement of his work, the best engineering of his time, the best training of all his faculties, that he can possibly command. You who are young men just starting out have got to have impressed upon you that this agricultural work that you are taking hold of is no simple work, no easy work, but is something that may, perhaps, demand the best that is in you from the physical standpoint, but certainly, if you are going to succeed, is going to demand the best that is in you from the experimental standpoint. That is why you are here. That is the meaning of the Experimental Union, and if it does what it was intended to do, it will help you to train the faculties which God has given you, and help you to arrange your work in such a way that you can work it out along the most scientific lines.

There are other problems that are presenting themselves to the farmers of this country, and I will just touch on one of them. And that, perhaps, is the most difficult, the most comprehensive of all. It is the problem of farm labor. There was a day in this country when farm labor was plentiful and cheap, when it could be had simply for the asking. But that day has gone by, and it will never come back to us again. We need never expect to have cheap farm labor again in the Province of Ontario. And it is exceptionally difficult for the great majority of our farmers to recognize that fact, and to adapt themselves accordingly. Year by year the cry for cheap farm labor comes up. We are never again going to have cheap farm labor in this country, and if we are going to carry on our farm work we have got to work this thing out, so to work it out with the labor at our command, and it is just possible that there will have to be a considerable advance in the rates of wages of farm laborers in this Province. I have talked to some farmers about this, and they say they can't afford to pay any more, and consequently they don't. I have asked other farmers, and they say, "Why, of course I can get labor. I never have any trouble." "How do you do it?" "Well, I pay good wages and I make provision for the labor to be housed on my farm." This question can be settled only along the lines referred to; that is, the market demands will have to be met. It is not a question of whether a farmer shall pay $10 a month or $15 a month or $25 a month. That is only half of the question. The question is, how much a farmer can afford to pay, not by the old standard, but according to the results that he gets. Here are two farmers side by side. The one man can hardly afford to pay $10 a month for farm labor. The man just across the line fence can afford to pay $25 or $30 a month. We know why, as students of agriculture. The man in the towns and cities who is anxious for the development of his business sizes up the situation simply from this standpoint: How much out of that man's labor can I make. If I can pay him $25 and get more than $25 back, it is going to pay me. If I pay him $10 and get only $8 back it is not going to pay me. Don't you see it is going to be the man with skill, the man with ingenuity, the man whose work is systematized, the man who is caring, and working with his head, and planning them all, he is the man who is going to be able to pay for high-priced labor. The man in the future, as conditions are in Ontario to-day, who is going to make a success of his own work, is going to be the man who is the best trained, the man who can work not only with his arms and his legs, but the man who can unite physical forces with the forces of mind and development of science.

We are coming to a new era in agriculture in the Province of Ontario. You who are here to-night will in ten or fifteen years be sitting not where you are. But you will be scattered, in charge of farms all over Ontario. And the work that you will be doing then will to a large extent be the outcome of the training that you are getting and giving to yourselves here now. It is not going to be so much the amount of knowledge or information that you take away from the agricultural college, that you are going to be able to apply to your work. The probability is that between now and fifteen years from now a great many of the theories that are being taught in the class-room to-day will have been superseded. There are theories that were taught in the college 25 years ago, when I was here, that have long ago passed. But that is not what is going to make you face the problems and situations. It is going to be rather the training of the mind, the methods of thinking, the intellectual and moral habits that will be formed while you are here. And I tell you this, that these two or three years will count more for the success of your work than perhaps the next ten or fifteen will. That may not impress itself upon you now. But ten or fifteen years from now you will see better the truth of it. You will never again have such an opportunity of developing your mind, that you have now at the agricultural college.

One other point and with that I will close. I make short reference to the indifferent farmer. For each one of you here there are twenty more out in the country who cannot come here, perhaps a hundred. Perhaps you have come to this agricultural college with the intention of centreing all your time and all your work and development on yourself. You are selfish, greedy, so to speak, training just yourself for this work. But the agricultural college is conducted within narrow limits as a matter of necessity. The Province of Ontario is of immense extent. You are a few outside of the many. Now, I want you to look at this question not from a narrow, selfish standpoint, but from the broader, provincial, national, standpoint. We have what I consider to be the most important work in the development of our whole Canadian wealth and prosperity wrapped up in our agriculture. But we cannot uplift our whole agricultural community. We can touch only one here and there. Now, if we are going to develop the Dominion of Canada as a whole, we have got to do it to a large extent through young men like yourselves. We have got largely to look to men who come here and train—who go out, so to speak, as missionaries and to carry what some people call "the gospel of the new agriculture" to the world at large. Keep this in mind, that you are doing it not for yourselves, but for the different communities in which you will settle down after you go from here, and you will be able to carry back from the agricultural college training, a little information, some instruction, but mainly that spirit, that enthusiasm, that right attitude towards improved agricultural work, which will mean so much toward the general uplift of the agricultural work of the country. Get impressed upon your minds that the field you are entering upon is the most wonderful, the greatest, the most important, the most complicated, of all the fields that we have. And that while you are here you are being trained not simply for the amount of instruction that you may get, but mainly that you may have your minds developed, your intellects sharpened, your enthusiasm quickened, and that when you go out from here to the country on which you are going to work, that you will take back some characteristic of the whole teaching staff of this college, a staff of which we may all well feel proud. We can look forward, then, I think, with hope, with anticipation, with pleasure, to the uplift and future development of the agricultural interests of our country.

ADDRESS.

Hon. Sydney Fisher, Dominion Minister of Agriculture, Ottawa.

It is rather trying for me to come before an audience like this, an audience of young men students who are fresh from the schoolroom and experimental laboratories, men who to-day are beginning that kind of work which I began so long ago that I am afraid I have forgotten a good deal of what I learned in those days. Twenty-five years ago I used to like to come before a farming audience and talk about some detail of agricultural work, explain what I knew about it, and call for discussion, so that I might go away with some new ideas. The course of my public life, however, has taken me away from the active work on the farm, on the land, and now for nearly fifteen years I have hardly seen my own farm, and have been engaged with what I might call the large commercial interests of the agriculture of Canada.

Mr. James has spoken to you somewhat on this line, but he has touched too little on it, because he, too, is a modest man, of the work of the Department of Agriculture of the Province with which he has been so long associated, and which, along with the whole Province, owes so much to him for its splendid success in this great agricultural Province of Ontario.

The work of the Provincial department deals largely, of course, first of all with the particular necessities of farming in Ontario, and next with what I may call the local application of the science of agriculture in the Province of Ontario. The Dominion Parliament and the Dominion Government had to deal largely with the commercial aspect of agriculture. You perhaps remember that in our constitution, commerce and trade are placed in the purview of the Dominion Parliament, municipal and local organization in the purview of the Provincial Legislature. I cannot illustrate perhaps the different work that is relegated to the different powers better than to point out to you that, by the municipal law passed by the legislature of the Province, you deal with the destruction of weeds upon the roadsides and in the fields. The Dominion Parliament and the Dominion Department of Agriculture has to deal with the elimination of foul weeds in the commerce of the sale of seeds for agricultural purposes in the country. This latter extends over the whole Dominion. The former is local. And so in the two departments there seems to be pretty well defined lines on which the one or the other may work in the interest of the farmer of the country, and those who are engaged in the settlement of the country. It is well that this is so, because by this means we can each do our work in harmony and sympathy, without overlapping, and without treading on each other's toes, and I am glad to be able to say that the department over which I have the honor to preside has been able in friendly rivalry and harmonious action, to work with the provincial departments all over the Dominion.

Let me say that I am glad indeed to meet the members of the Experimental Union. You are spreading all over the Province to a very considerable extent the work of this College and the experimental work which is carried on here under our old friend and worker, Mr. Zavitz, who has perfected this work to an extraordinary degree in the College grounds and fields, and who has been the life of this Experimental Union all over Ontario. (Applause.)

In each part of the Province where a member of the Experimental Union lives he must necessarily be the centre of the distribution of knowledge, an example to be followed by his neighbors, and an illustration in his fields and in his

crops of the better methods which he learned while he was here or with which he has been experimenting since he left. The Guelph College has been a power of strength to the agriculture of Ontario. I can remember when it was largely a question as to whether it was going to live and be a success. Now that time has entirely passed and its influence and its labors are expanding and increasing all the time and everybody in the Province, whether he be a laborer, or a merchant, or a railway man, or a manufacturer in the great cities of the Province, just as much as the farmer through the length and breadth of the Province which you, Mr. James, have to administer to in the Department of Agriculture at Toronto, recognize that the time spent by you young men here is well spent, and that the whole Province and everybody in it benefits through the work of the College. Why is this? I believe in the first place it is because you have a well trained staff who are able to carry on the scientific experiments and work out the scientific problems which are becoming more and more acute in agricultural work. But even more than that, the success of Guelph Agricultural College is dependent upon the application and the teaching of the application of these experiments to the every day work of the farm. If you young men go home with your heads stuffed with knowledge, with a full and complete memory of all you have seen and learned here, and then do not put it in practice, what good is it to you or to the Province? I am afraid we all of us, perhaps, know a little better than we do. There is a little natural weakness in human nature, to not do just as well as we know how. But the nearer we come to doing that, the better for all of us. I believe that the majority of Guelph students endeavor to carry out in practice the work they learn here. I have said this frequently to public audiences, because I really do believe that the farmers in the Province of Ontario to-day who are making the most money on their farms, are the graduates of this college. (Applause.) You know better than I do. But I have known many instances of men who have gone home to their fathers' farms or taken other farms and by reason of their training here in that new agriculture which Mr. James has spoken of, have been able to make money and show an example of success in life.

That new agriculture is indeed a new thing for this country. It is not very long ago that farming was looked upon as a drudgery, that it was only by hard manual labor that a man was expected to succeed. And, indeed, a great many of the mass of our people, even many of the fathers of you young fellows or your grandfathers, did not admire, but rather despised a man who did anything but apply his muscle to his farm work. All that is changed, and to-day the man who succeeds is the man who uses his brains on the good farm, who has a fair amount of land, and a fair amount of labor to use upon it, because his mind is trained, and that is necessary for successful farming. Things have changed in another respect, too. For a long time, and up till quite recently, the man who was engaged in other walks in life in Canada, I think, on the whole got a larger reward for his toil than did the farmer. I am not going to speak of the other acts of life which perhaps are more important than we generally think they are, I am speaking now of the money reward and the money reward alone, and leaving aside the fact that the man who lives in the country on the farm, the men and women and children who live on the land and in close touch with nature, who have the clear air around them, who have the babbling brooks and the lovely woods around them, have a reward which the city dweller never can get by the expenditure of any amount of money. But I will take only the money reward, and till quite recently it was a fact that the city dweller and most other workers got a larger money reward for their year's labor. I think that to-day that is considerably changed.

And I believe that with the higher prices of agricultural produce, and with the greater expenses attendant upon city life there is at the end of the year a larger balance of profit to the good farmer than there is to almost any other man in the community at large. We have, therefore, a fair ground for hope that in the near future if this continues, the tide from the country to the city, which is one of the great troubles of all our agricultural communities, will cease and that on the contrary we hope soon to find that our city dwellers are seeking the country. Seeing the opportunity of making a fair living, of obtaining good reward for their toil, and the cheaper cost of living, they will leave the city and seek the more enjoyable freedom of the open country.

What is the condition of affairs to-day with regard to the cost of living? What is the cost of living? It is simply the price that has to be paid for those necessities or luxuries of life which the people think they must have. And to-day the city dwellers are complaining of the cost of eggs, cheese, and butter, and meat and vegetables, and those things the farmers produce for them. My answer is, "If you are so discouraged with conditions as you find them in the city, leave your city life, and come out to the country and produce the things, and make the people in the city to pay you." And I believe a good many of the city dwellers to-day are beginning to see things in that light, and the result is that there is a tendency amongst city people to seek peace and comfort where they can learn to love nature as it can only be seen and appreciated in the country. This will be a good thing for Canada, and social life in the country. Because we here in Canada for many years to come must be a nation of farmers, a nation whose dependence and whose economical condition is dependent upon the production of the soil.

There is another thing, too, which is hopeful. The farmers are making themselves heard. Mr. James said that we public men must keep our ears to the ground and hear the farmers. We don't have to keep our ears to the ground in order to hear the farmers. We would rather have to stuff our ears to prevent deafness. But there is no danger of our stuffing our ears. If there is one thing any man in public life watches for, it is to see what the large body of electors want. And as the farmers in Canada to-day are the largest body of electors, you may be quite sure that the representatives of the people are listening pretty closely to what the farmers have to say, and will be inclined to follow closely the directions that the electors give to them.

Just a word in regard to my own Department of Agriculture. I said a little while ago that its function is to control those things generally concerned with the commerce tending upon agriculture. We have at Ottawa, therefore, to deal with the progress of the more or less finished product. We have, for instance, to inspect the grains. Our Northwestern friends, the grain growers of the three prairie provinces, are intensely interested in the character and quality of that grain. By the system in which the grains of these Provinces are exported, the standards are fixed by officers of the Dominion Government. There is a supervision over the cleaning and grading of these grains. And to-day there is an insistent demand that the Government should go further and manage the elevators through which these grains have to pass.

In my own department we have the question of The Fruit Marks Act, an Act which deals with the marking of fruit in closed packages, a law which requires that it should be true to its name and character, properly marked, marked to its grades. And the Dominion Government has to have a staff of inspectors all through the country to see to it that the Canadian fruit grower in packing his fruit lives

up to the law and gives an honest measure and an honest quality in the fruit which he supplies. Great improvement has been made in this respect since the law came into force, but even yet there is room for improvement. Much of the trouble is caused through the ignorance of the packers of the requirements, and we therefore have to multiply this work, and see that the good name of Canadian fruit is not spoiled. And the fruit growers of the Province of Ontario find that the Prairie Provinces are perhaps as good a market as they can find anywhere. And as in each Province the law is administered by the Dominion authorities, the Dominion has to step in between transactions of commerce between the different Provinces. And, therefore, we have to deal with the fruit passing from one Province to another. The same is true in regard to our meats and packing houses. There have been laws passed by other countries which necessitates Government stamping or marking of the meats that go into those countries. Then a question which comes to the foreground is an international one. But when meat products have to pass from one Province to another the provincial authorities cannot control, because they have not any jurisdiction outside of their own Province There again the Dominion Government has to step in under laws provided by the Dominion Government, and see that the packing houses which export either to other Provinces or abroad are cleanly and properly managed. Here, again, we have to have a large staff of inspectors at the meat packing establishments and the ports of export. But that doesn't relieve the provincial authorities from the necessity of dealing with the public health in each locality or municipality under the provincial or municipal law.

Again we have the question of the seed trade which I gave as an illustration a few minutes ago. Unfortunately in Canada I think one of the greatest enemies in the way of successful and progressive agriculture is the terrible scourge of the weeds which terrify our whole country and do so much to decrease the profits of our crops on all our lands. As far as municipal law is concerned, dealing with the weeds on the roadside and so on, it is passed upon by the Provincial Government, but when it comes in the commerce, whether it be in seed grain or in grain for feeding, if the distribution of weed seeds is brought about in its commerce, it is the duty of the Dominion Government to step in and see to it that agriculture is not hurt in this way. We therefore passed the Seed Control Act, and appointed inspectors that go to see to it that the seed merchants do not sell seed grain which contains the weed seeds which are forbidden by the Act. This, again, is a large work, extending over the whole country, as all this work of inspection does which is under the control of the Dominion Government. And let me say to you that this work extending over the whole Dominion is a very considerable charge, a very considerable piece of work, and requires a large staff of competent and honest officials. If there is anything, however, in regard to the Department of Agriculture at Ottawa of which I have reason to be proud, it is the fact that I have a splendid lot of men at the heads of the different branches, and inspectors to carry on their work honestly and efficiently.

It is sometimes asked me why it is that certain things at Ottawa are put into the Department of Agriculture. I am not very sure that I can tell you why. Take the work of taking the census, trade marks, quarantine of humanity, quarantine of animals, the statistical work, and carry that on year after year. All these things have not practically anything to do with agriculture, but in the old days there was not a great deal to do with regard to agriculture, and when the Minister of Agriculture did anything whatever in regard to the farmer it was something almost unusual, and so they gave him these various other affairs to look after.

Now, I do not want to talk to you in figures. The Chairman said, "He will present to you, no doubt, facts and figures." Figures are rather difficult to carry away in one's mind, and rather trying to listen to, but I want to say a word with regard to intensive farming in Canada. I have got to say that we do not know anything about intensive farming in its real meaning in Canada. We have to go over to the Chinee or the Jap, or to the southern part of Italy, or to Belgium to find an example of intensive farming. I remember once seeing in Southern Italy a piece of land on which four crops had been produced in a year, a considerable area, too, and just at the time I was passing through there was a hay crop on the land, which had followed a grain crop, and earlier in the year there was a large return from a number of olive trees, and at the trunk of each tree a vine was planted. That piece of land had produced first of all a grain crop, then a root crop or garden vegetables, and then a crop of grapes, and then a crop of olives in the one season. And in another piece of country I saw what I might almost call "little regiments"—men in line going along with great big heavy staves and turning over the soil in row after row something like a team would do in this country. These men cut through the soil like the blade of the plow would. But they were leaving that land in a state of fine tillage ready for a crop in a way that none of our more hasty and perhaps more economical ways will do. And it was by reason of that fact that that land was made to produce four crops in the year. This land was in the neighborhood of an old Roman city, and had been tilled in that way for century after century, and was more productive that year than it was in the days of long ago. We do not know in this country yet what intensive farming is.

I want to give you a little information about the average production of crops—that is, not of experimental crops, but of what is done at one or two of the experimental farms under our system. At Indian Head in Saskatchewan this year, which was a bad year in grain production in the Prairie Provinces, a whole field of Marquis wheat at that farm produced an average of 53 bushels and 6 pounds of wheat to the acre. Another field of Marquis produced 44 bushels and 36 pounds to the acre. Three and one-third acres of Early Red Fife, 42 bushels and 42 pounds per acre. These are pretty good yields of wheat on land that is not fertilized, has never been fertilized, and in a bad year in the Province of Saskatchewan. The average production of wheat all through Canada this year I think was about 20 bushels.

In oats on that same farm the Abundance variety yielded an average of 91 bushels and 13 pounds to the acre. There were two fields of Banner oats, one field produced 90 bushels and 5 pounds to the acre, and the yield in the other field was 83 bushels per acre.

I do not know exactly what your yields of barley are here. I am speaking of these as field crops treated just as any ordinary farmer can treat his land, not with experimental plots, not with any advantages that any ordinary farmer could not give his land. The Mansfield barley, in a field of two and three-quarter acres, gave 197 bushels of grain, or an average per acre of 71 bushels and 18 pounds. The Mensury barley gave 609 bushels of grain off nine acres, an average of 67 bushels and 32 pounds, and O. A. C. No. 21 gave 59 bushels to the acre. These are the Indian Head returns. I may say that the Brandon crops this year were very poor, the wheat there averaged only 22 bushels, the oats 36 bushels, and barley 35 bushels per acre.

In Lacombe, Alberta, the spring wheat in the fields averaged 35 bushels per acre. The only grain crop in the fields that we had in the Experimental Farm at

Ottawa was Banner oats, and these gave an average yield of 54.5 bushels per acre on a total acreage of 59.34. I give these just as an illustration of what can be easily done by the ordinary farmer in any part of Canada.

The total crops on the 32,000,000 acres were valued at $507,000,000, or $25,000,000 less than last year's total crop of Canada; a decrease which was almost entirely due to what is called the bad season of the three Prairie Provinces. The crop there was $40,000,000 worth less than that of last year. If it had not been for the average crops of Eastern Canada we would have been very much worse off. They were worth $14,000,000 more than the similar grains last year, and some of the other crops showed a gain of a million dollars. But the wheat crops, and oat crops, and barley crops, of the North-West Provinces came to $40,000,000 less, making the total balance of $25,000,000 less from the field crops of Canada this year as compared with last year.

But, still, in perhaps what was a bad year, the aggregate crops of this country came to a value of over $500,000,000, a pretty handsome sum for the production of the farmers of this country. Now, I may say that, referring to the intensive farming that I have been talking of in Italy, it would be no trick at all for us to add at least 20 per cent. to this crop and turn that $500,000,000 into $600,000,000, with no more money expended. Just a little more intelligence, a little more knowledge, a little more grit applied to the work. There is an opportunity for an increase in crop yields of this Canada of ours, such as is unparalleled. This opportunity is in the hands of the farmers of this country, and I venture to say that if the farmers would do as well as they know, they would do that without any difficulty, without any additional expenditure or investment, and probably add a great deal more.

Mr. James spoke of the dairying industry of Ontario, and I venture to say that there is perhaps no more interesting business, and not one more open to improvement than dairying. Many years ago I studied dairying, and I found I and my old friend, Governor Hoard, of Wisconsin, that the difference between the product of the cows in individual herds was so great that it often amounted to the difference between profit and loss in the whole industry, and that, as he used to put it, a number of the cows boarded and lived on the good cows in the herd. He went into the system of cow testing, as it is called, and established that in Wisconsin, and I do not think he got anything for it other than satisfaction in the great improvement of the dairying industries of all Wisconsin. We have been, I confess, stimulated by the studying of the Danish method, and by the things which the Danes have shown to us, and the rest of the world in their dairy industry. We found there all testing by co-operation, by mutual assistance, and as a result we tried to start cow testing in Canada. It was uphill work at first to get people interested in it, but we have been working along without any relaxation without getting discouraged, and I think to-day I may say that this business of cow testing has reached the day when its place is assured as a business in Canada. We had last year a very considerable increase of cow testing in the country with just the same expenditure on the part of the Department, and the same number of men. In 1906, the first year, we made 17,125 tests; in 1907, 41,257; in 1908, 43,518; in 1909, 53,883; and in 1910, up to the 1st of November, we made 64,603 tests. And I venture to say that in some of the months in 1910 the number of cows tested ran up as high as 3,000 more cows tested than there were in the corresponding month last year, and we had six, eight, seven, six, and five thousand in different months, more in 1910 than we tested in the same months in 1906, showing a natural increase. And, what is more encouraging, the men who started in the last few

years have kept to the job and are more enthusiastic than ever in regard to it. This year there were 1,200 odd herds tested by my officers, a very substantial increase, and a very satisfactory result. The Associations in Eastern Ontario were 25; in Western Ontario, 42; in the Province of Quebec, 62; in New Brunswick, 11; in Nova Scotia, 4; in Prince Edward Island, 17; and in British Columbia, 6; a total of 167 associations, with just over 12,000 cows, being tested. This does not tell the whole of the story, however, because in addition to these association tests we have a large number of men who make their tests individually, and who do not make any return. I do not know to-day any part of the dairy work of a country which is more important than this, and which is doing more for our dairying production. Unfortunately, our dairy products have not increased as rapidly as they might have. But they have increased, notwithstanding the fact that our butter export trade has practically disappeared. Our cheese export trade this year was a little more than last year, and is fairly well maintained, although not nearly as great as it was four or five years ago. But the fact is that the increase in home consumption of our dairy products has been so great in consequence of the population pouring into the country, and the prosperity of the people who are in the country, the home consumption has increased so enormously as to more than overtake the production increase. This is unfortunate for the country at large, and it is unfortunate for those men who have left farming and gone into other walks in life, because had they remained on their farms they would have been to-day producers instead of consumers, and able to reap the benefit of those enormous prices which to-day are so prevalent in our country. This is a showing of which I am rather proud, and I bespeak for it your hearty approval and co-operation. Do what you can yourselves, and also with your friends and relatives at home. Get them to join the associations for cow testing and to be able to encourage this work and thereby increase the production in this country of all our dairy products.

I do not want to go into further details. But I have tried to give you a little outline, by no means complete, of the kind of work that the Department of Agriculture at Ottawa is doing. And I may say that I have never hesitated to ask Parliament for the money to carry on the work, and am glad to be able to say that Parliament has never refused money which I could show could be economically used and would give a good return for its expenditure. In fact, I have been reproached for not asking for and spending more money, but I know that the farmers of the country themselves would not want money to be wasted upon them; they want it expended in the places where it will bring the best possible success and return.

I believe it is well that I should have an opportunity thus of saying these few words to the students of the College and the Experimental Union, and I want to thank the officers, President Creelman and Prof. James, of the department, for the opportunity of appearing before you and saying these few words, I hope before going home to get new ideas, and get some information which will help me in my work for the country in the Department of Agriculture.

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